TECHNOLOGY DEPT.

Gas Journal

VOL. 290. 109th YEAR. LONDON, APRIL 17, 1957. No. 4892 PRICE 1/6

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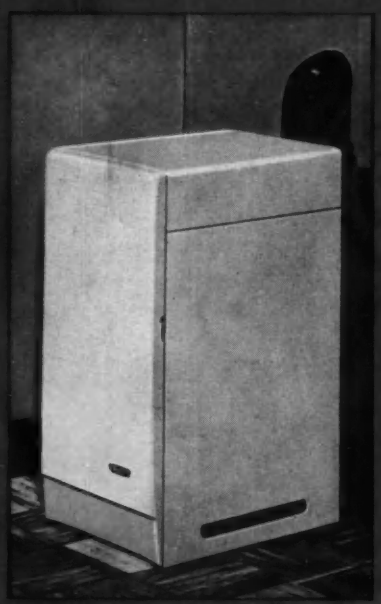
a whole year's central heating for less than £50*



The 'Diplomat' 30, one of the latest additions to the Potterton range, is available in a choice of four colour schemes. Price £57.18s.8d. including Purchase Tax.

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for central heating and hot water
MODELS OF SELF-CONTROL

in a post-war three-bedroomed house

These figures are for an earlier 25,000 B.t.u/hr. 'Potterton' boiler during the period October 1955 to October 1956, with gas at 1/4½d. a therm. They surely prove that there is a ready market for the highly efficient gas-fired boiler in the average house. This particular house is cavity-walled, insulated between rafters in the roof space and fitted with plate glass windows. The eight radiators have a total radiating surface of 165 sq. ft. Two factors contribute to these low running costs — the high efficiency of the 'Potterton' boiler and the accurate controls with which it is fitted. Of particular importance is the clock control which switches off the boiler for a specified period during the night and the day. There can be no doubt that many householders are keen to install a boiler which looks after itself and which does away once and for all with problems of fuel supply. They are in fact waiting to be shown a 'Potterton' boiler — the *automatic* choice. It is not expensive in first cost and it is simple to install. But, above all, it can cost far less to run — especially under the new tariffs in some areas — than many people imagine.

* *The actual running cost for one year was £46.19s.1d.*

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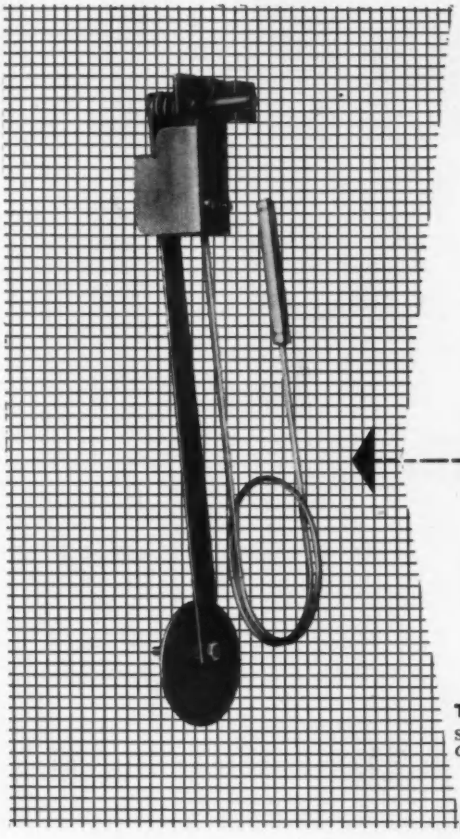

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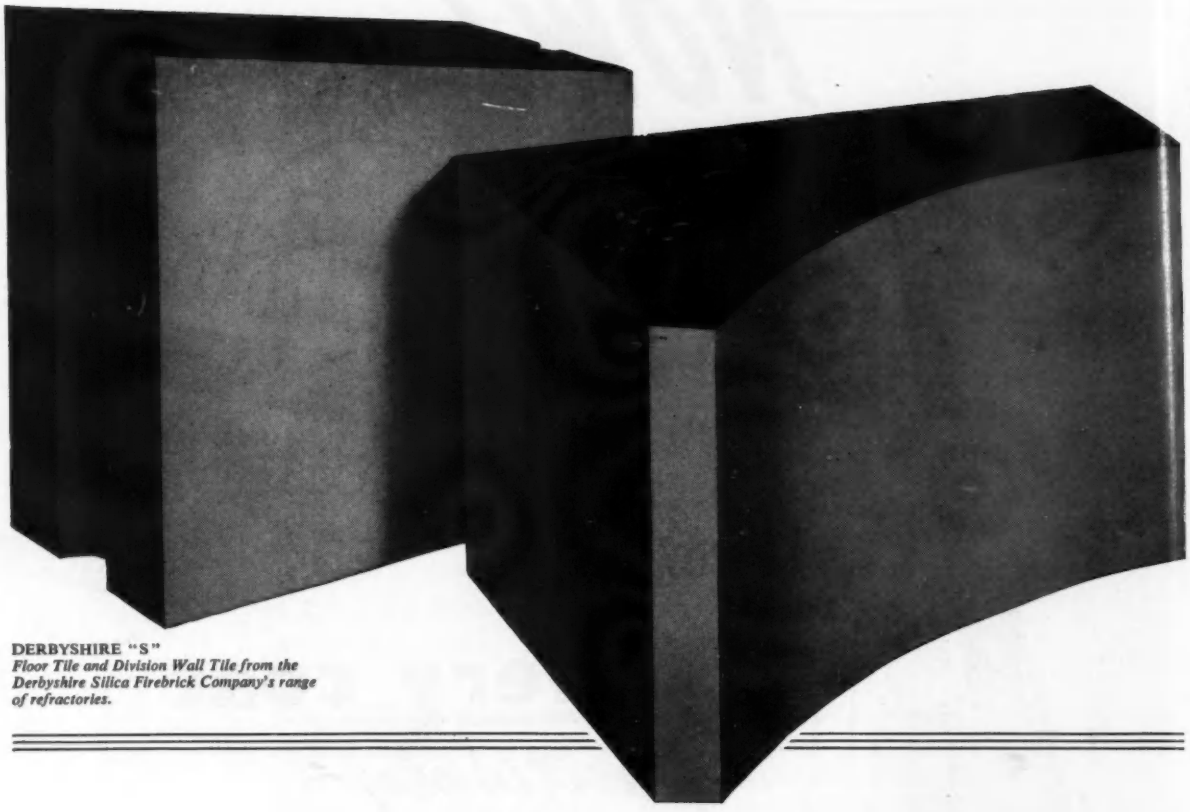

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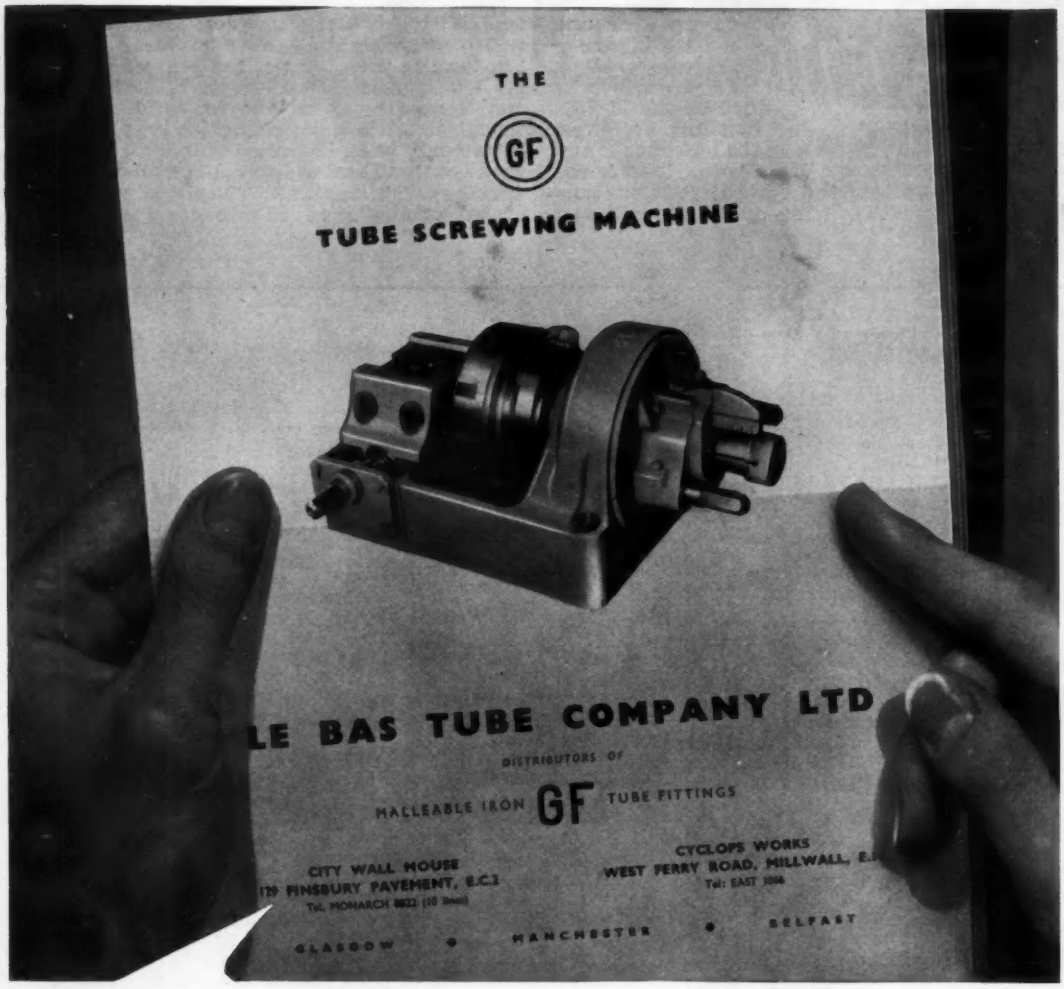

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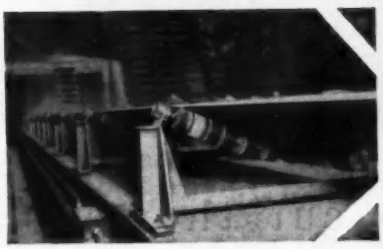
"I MUST ADMIT I WAS SURPRISED BY THIS REPORT"

"Belt wear and the cost of replacing conveyor idlers has always been one of our biggest handling problems, and, naturally, I've always been on the lookout for any new method of increasing the life of both. Coke is one of the most difficult materials to handle, and our normal idlers just weren't standing up to the wear and tear. With this sort of problem I was only too willing to let young Johnson have his head with this new Limberoller idler. When he wanted to let the Joy-Sullivan people install ten of these idlers at one of our trouble spots on the conveyor lines I readily, though in truth a little sceptically, gave the 'O.K.' It was only when he presented his report to me a few days ago that I realised the Limberoller idlers had been working for six months. Obviously, he got a big kick out of that report — and I don't wonder. Just look at this:—"



TYPE OF IDLERS : Limberollers. Designed by Joy in America. Built in Britain by Joy-Sullivan Ltd.

BASIC DESIGN DETAILS : Revolutionary design. Flexible steel cable covered in Neoprene and with Neoprene discs. Uses only two sealed-for-life bearings. (And they really are sealed-for-life).

NUMBER OF IDLERS INSTALLED : Ten.

PLACE OF INSTALLATION : South Bank—a constant trouble-spot.

DATE OF INSTALLATION : 5:3:56

DATE OF INSPECTION AND REPORT : 5:8:56

RATE OF WEAR : No wear as yet. Mould flashings still clearly visible on discs.

CARRYING QUALITIES : Excellent. Limberoller idlers shape themselves to the load carried. Spillage reduced.

INSTALLATION DIFFICULTIES : None at all. They are far lighter and more easily installed, knocked down and moved.

MAINTENANCE PROBLEMS : Again, none at all.

SPACING ON BELT : Very economical. Each idler supports more belt than any conventional type. We are using 5' spacing.

RELATIVE WEIGHT : Complete Limberollers weigh as little as one-third of the weight of our existing idler sets.

RELATIVE COST : Very competitive. Neoprene is a must for the really tough jobs, but with less idlers per belt cost is kept down. Rubber Limberollers would be ideal for easier conditions such as the Victoria Works, and naturally cost less.

R. W. Johnson

R. W. Johnson.

"Well, there you have it, gentlemen. For about fifty pounds we have tested these Limberollers and the potential savings revealed more than justify the experiment. Just think what we could do if we standardised our entire conveying system with Limberollers."

Just think what you *could do. Why not contact Joy-Sullivan now and try the ten Limberoller test yourself.*

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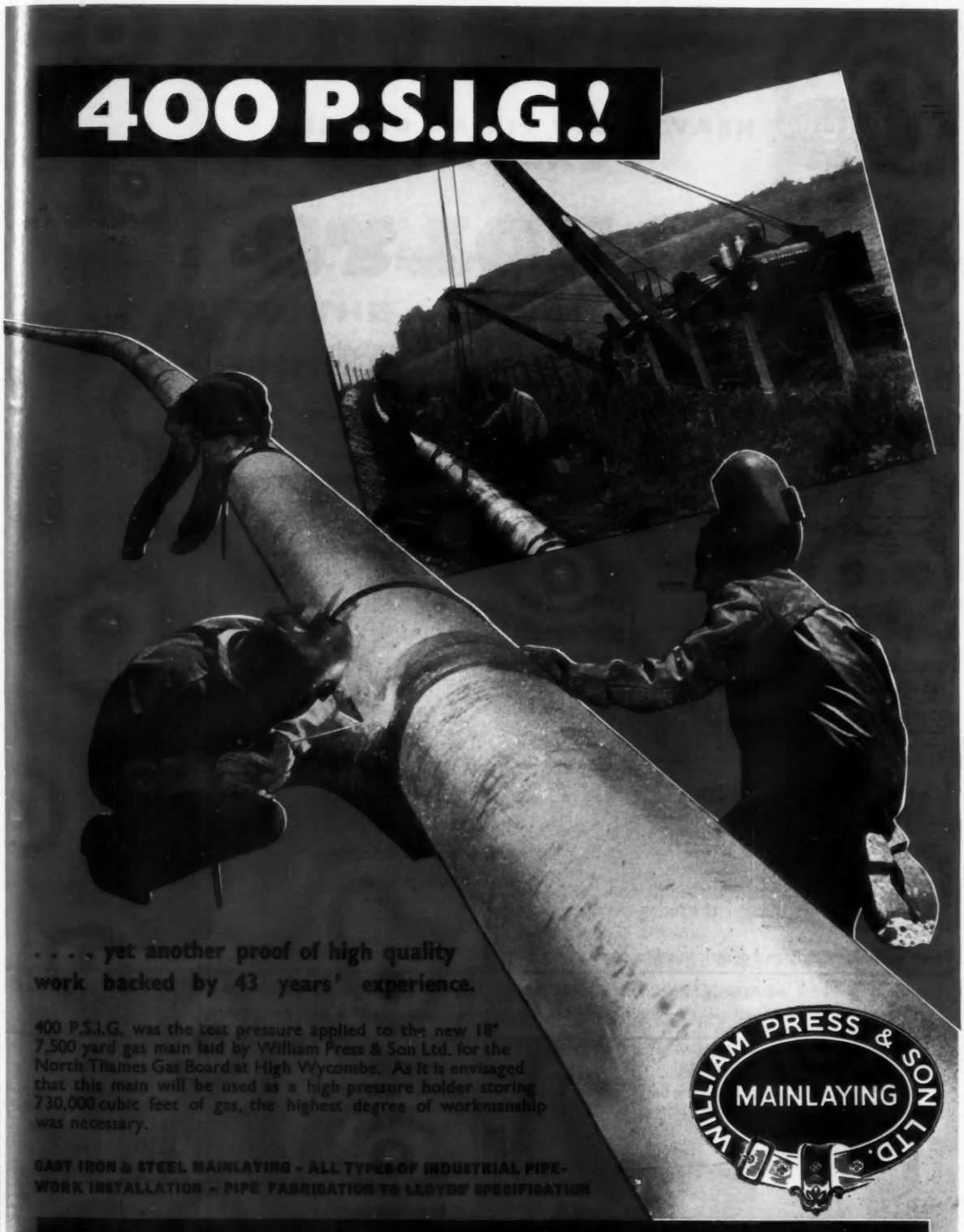

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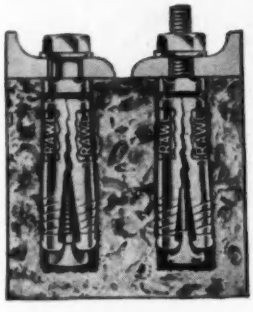
Rawlbolts have earned a sterling reputation for strength and reliability throughout the world—they are used by the million every month. Rawlbolts grip by *expansion*—their strength as a fixing is based on the enormous compressive strength of concrete itself.



RAWLBOLTS ARE MADE IN TWO TYPES

For fixing heavy machinery to floors there is the Loose Bolt type of Rawlbolt which enables the machine to be slid into position after the Rawlbolt has been inserted. For wall fixings use the Bolt Projecting type which will position the fixing before tightening up.

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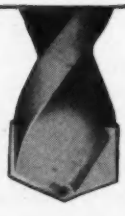

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For use in hand and electric drills for Rawlbolt sizes C to G.

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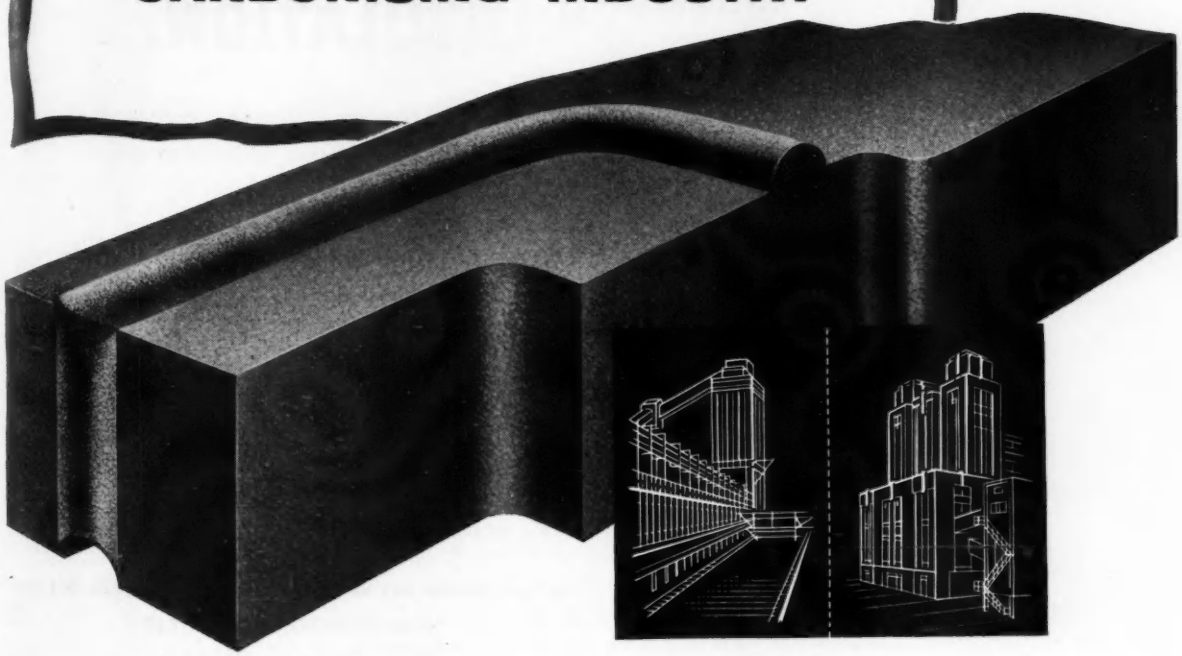

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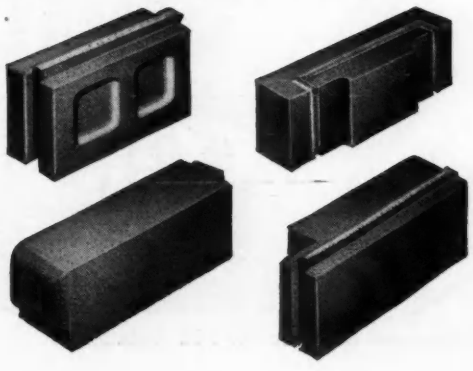

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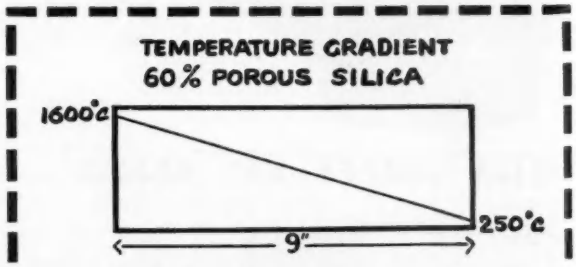

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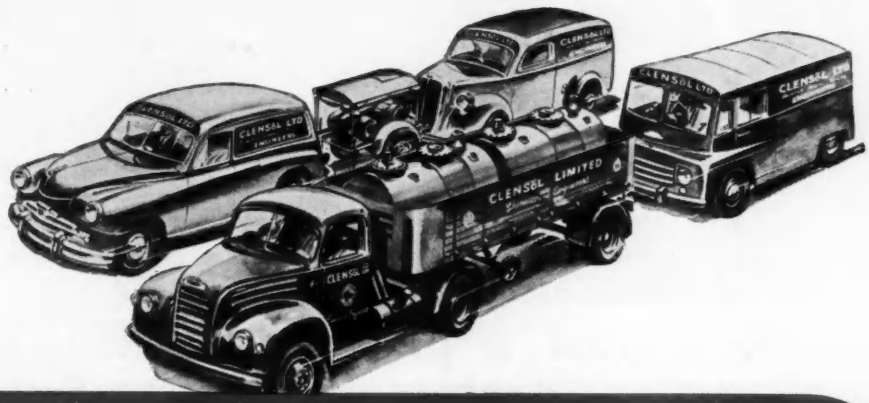

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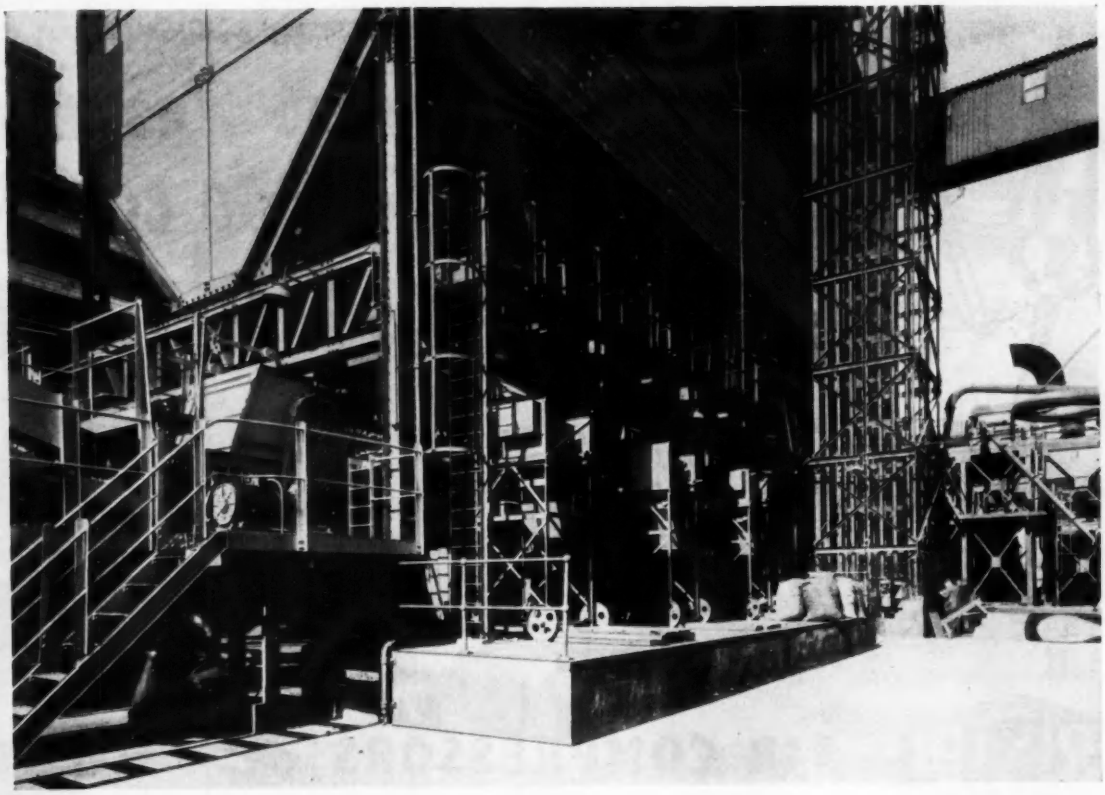

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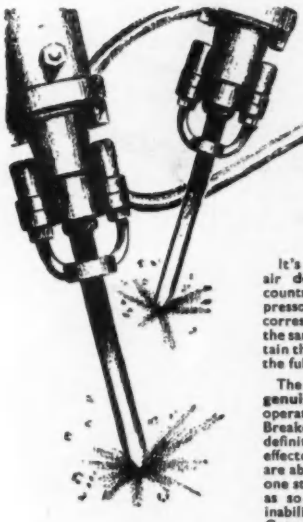

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The "BRISTOL" Model '139' is a **genuine** two-tool Plant which will operate two heavy duty Road Breakers **simultaneously** for an indefinite period. Great economy is effected by the fact that two operators are able to work together instead of one standing idle watching the other, as so often is the case, due to the inability of their so-called "two-tool" Compressor to maintain the necessary pressure.

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The photograph of the "BRISTOL" Model ATS/139/PD2 2-Tool Plant (F.A.D. 120 CFM) in action in Bristol's city centre is reproduced by courtesy of the City Engineer of the City and County of Bristol.

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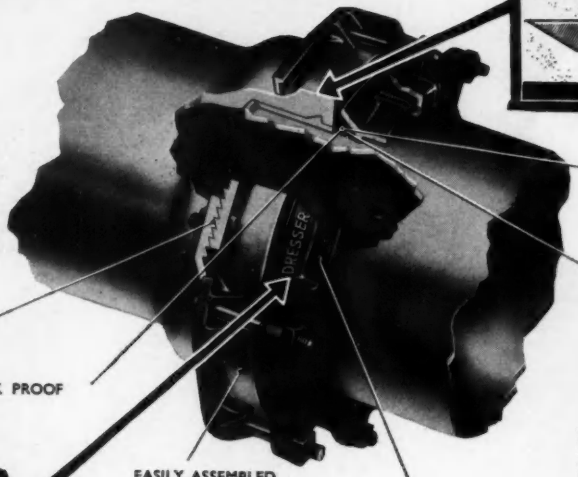

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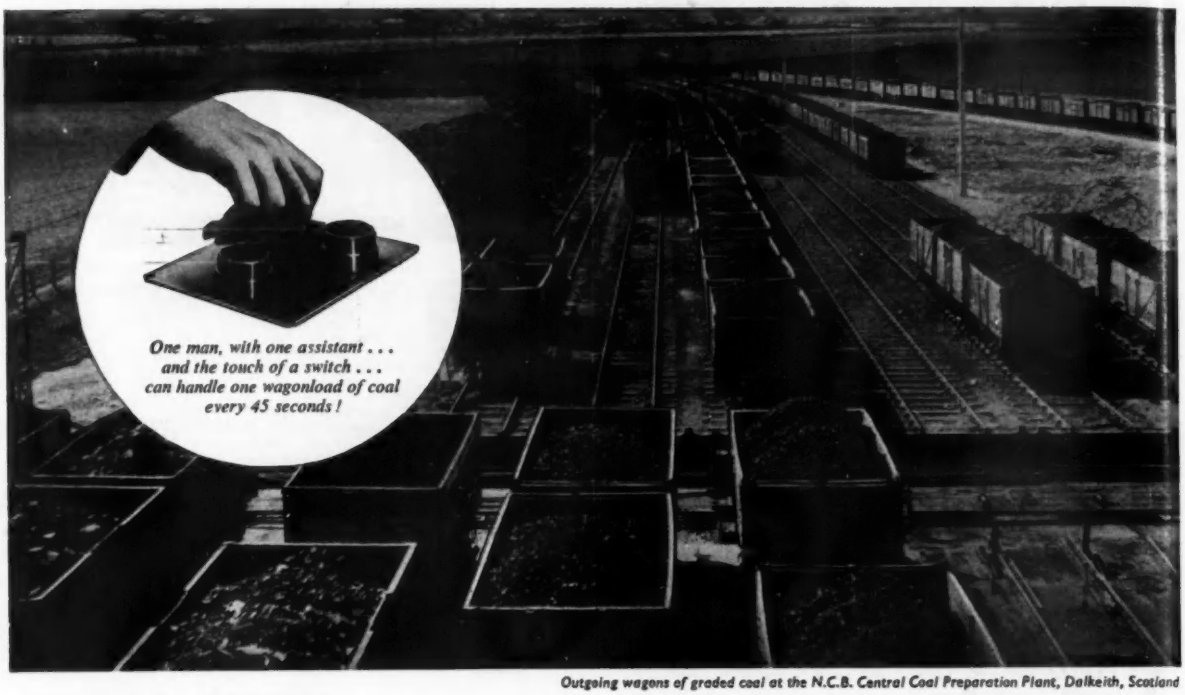

Outgoing wagons of graded coal at the N.C.B. Central Coal Preparation Plant, Dalkeith, Scotland

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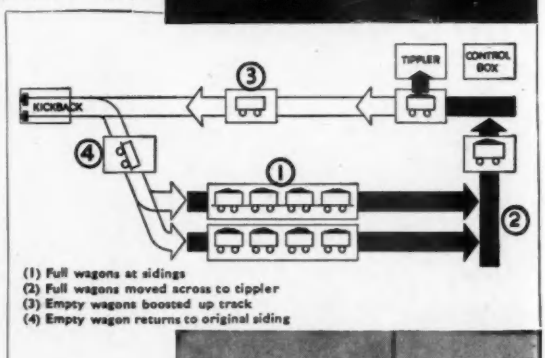

(1) Full wagons at sidings
(2) Full wagons moved across to tippler
(3) Empty wagons boosted up track
(4) Empty wagon returns to original siding

An installation at the British Electricity Authority Freemens Meadows, Leicester, handling 800 tons of coal an hour. The site is limited in area and normal methods of working with balloon sidings would be impractical. The pictures show the traverser pulling an incoming truck on to the transfer rail and an emptied wagon being returned to the siding by the 'kickback'.

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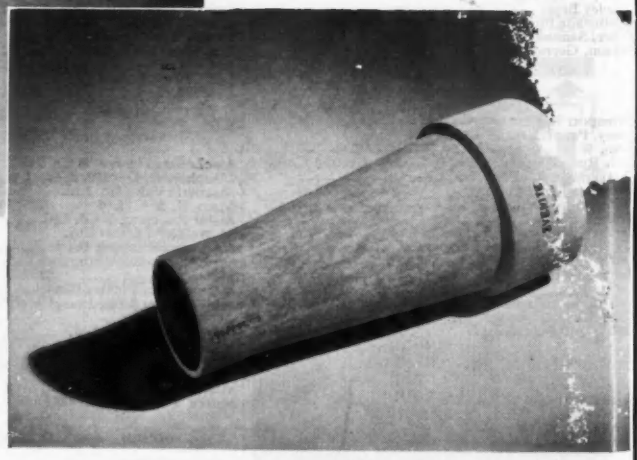

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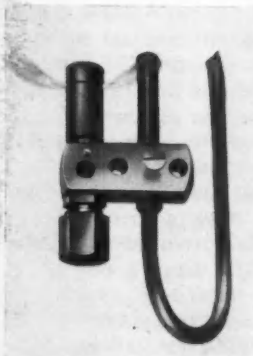

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Gas Journal

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109TH YEAR

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Gas Journal

VOLUME 290. No. 4892 APRIL 17, 1957. 109th YEAR

The Industrial Gas Engineer

EACH year it becomes increasingly obvious that the gas industry's future prosperity is intimately bound up with the sale of gas to industry. Of course, our dependence on the industrial load is no new thing, but it is surely true to say that the tremendous importance of this business, even in areas which have relatively little industry, is only now becoming fully appreciated. The point was brought home most forcibly when, for the first time, the domestic load graph, after levelling out, showed a minute dip and it was realised that it was the up-thrust of industrial sales which was responsible for the overall figure showing a satisfactory trend. Why has the industrial side of the industry's sales organisation been so much taken for granted in past years? We can suggest two fundamental reasons. One is that the total number of people engaged in this work is extraordinarily small, particularly when seen in relation to the gas sales they represent. Salesmen whose work it is to sell to the domestic consumer are extremely numerous; there are enough of them to run salesmen's circles with a substantial membership in each group. Yet that group may not have even one industrial representative. That then is the first reason for lack of recognition—small numbers. The other reason—and this is purely speculative but, we believe, not far from the truth—is that the industrial representative is primarily an engineer. True, he must sell his product and his service, but it is obvious that technical knowledge and accomplishment rather than mere personal pursuasiveness wins the business.

This means that the industrial representative will probably have a certain type of personality. He is more likely to be a quiet, competent, fellow than his perhaps more extrovert colleague on the domestic side who relies to a great extent on his personality in making a sale. The result of all this is that the industrial man, working with the utmost zeal and achieving valuable results, nevertheless tends to hide his light under a bushel. The greater interest which is now being taken in his work by others is not due to any change of heart or outlook on his part but, as we have suggested, to a more general appreciation of the importance of his labours. For one thing more attention may be paid to giving the industrial gas officer what he wants—more men (if he can get them), better facilities, and permission to spend more on development.

Circumstances vary in different parts of the country. For example, before nationalisation in some areas only the largest undertakings sported an industrial man. Smaller undertakings often missed the chance of worthwhile industrial business simply because there was nobody to go and find it. In such cases nationalisation has done a great deal of good and the creation of officers responsible for the whole area has resulted in a systematic search for new business and new uses to which gas can be put throughout the area. Even so, there is still a great deal of work to be done.

Broadly speaking, nationalisation brought little change to the work of the industrial section of the Birmingham Gas Department. Always the hub of British industry, Birmingham has long had an industrial gas load which has been the envy of the whole industry. But it must be emphasised that the magnitude of this load is not due solely to the geographical concentration of industry in the area. It is also due to the tremendous amount of field work which has been undertaken in the past by the industrial section there—work which has certainly been further concentrated and extended since nationalisation. An interesting picture of this work is contained in the paper by Mr. A. C. Jennings, the Board's Industrial Gas Officer, which we publish in this issue. Under the title 'The Industrial Gas Service of the West Midlands Gas Board,' it traces the growth of the industrial department from its establishment in 1909 to its position today when, as a result of its labours, sales of gas to industry in the area of the West Midlands Gas Board amount to 165 mill. therms per annum—just over half of the Board's total sales. It is interesting to note that at the outset the work of the department was concerned with the jewellery trade alone, a trade which now accounts for some 20% of total sales. Consumption

by the motor industry constitutes another 20% and that by the potteries 21%. For the rest, ferrous and non-ferrous metals between them account for 22%, and general engineering and a remarkable variety of other trades for the remainder.

Since nationalisation the building and equipping of a new heat treatment establishment at Adderley Street and the conversion of the old heat treatment shops at Brasshouse Passage into well-equipped premises housing the industrial design and development sections of the Board, have further enhanced the department's scope and reputation. Some of the work carried out in the development laboratory is done in collaboration with the Midlands Research Station of the Gas Council at Solihull, and in passing it is perhaps worth noting that the West Midlands Gas Board has the distinction of having the only industrial centre with a heat treatment service.

The organisation of the headquarters advisory service is interesting. The facilities are made available to industrialists through divisional gas officers who are responsible to their respective divisional general managers for the sales of gas to industry in each division. Contact with any gas office or showroom is all that is necessary to put the consumer in touch with the service. Where problems cannot be solved by the local staffs in the divisions the query is referred to the headquarters industrial gas organisation. When such a problem is referred to headquarters it is first decided whether or not it requires design or experimental development, and if it does it is passed to the engineer, who has a drawing office and development laboratory under his control. The carrying out of experiments and the designing and testing of prototype plant can constitute operations of some magnitude, but of course it is work of this type which has built up the enormous confidence in the Board's industrial gas service which is felt by consumers and which has been reflected in the steady growth of sales in this area. Into the Birmingham organisation has been integrated the department at Coventry where the gas undertaking also enjoyed an enviable reputation in pre-nationalisation days, setting up a production heat treatment shop which is now situated in Abbots Lane, Coventry.

Mr. Jennings explains that although advice on heat treatment problems is given free, a charge is made for production heat treatment of components. In the same way, in connection with the work in the industrial department as a whole, advice on the use of gas in any industrial process and experiments in connection with prototype plant are also free to industrial users. Later in the paper the author gives some typical examples of the work undertaken and reveals that at the present time more than 60 projects are being given consideration by the department.

Also in this issue we have included a paper given by Mr. H. R. Cooke, Senior Industrial Engineer to the South Eastern Gas Board, on 'Industrial Application of Air Heated by Gas,' and presented to the London Juniors. The paper emphasises the many and varied applications of gas in this one sphere of industrial heating and the amount of original thought and experiment which went into the building of this load.

We hope readers will agree that the prominence given in the following pages to the work of the industrial gas engineer serves as a useful reminder to us all that he is perhaps the most significant figure in the creation of our future business.

Capital Investment in the Fuel Industries

THE White Paper on Capital Investment in the Coal, Gas, and Electricity Industries, published last week, shows the capital to be invested in these industries for the financial year 1957-58, and quotes the forecasts made by them and published in various pamphlets. In 1954 the Gas Council showed in its pamphlet 'Fuel for the Nations' how the gas industry was likely to expand between 1953 and 1960. The same year the plans for the electricity boards in England and Wales appeared in the electricity industry's 'Power and Prosperity.' Later the Coal Board outlined its plans in 'Investing in Coal' which appeared in 1956.

In 1954 the Gas Council forecast that by 1959-60 the annual demand for gas throughout Great Britain would amount to 2,924 mill. therms, and over the seven years it had plans to spend £346 mill. on capital investment. The boards now, however, estimate that the demand for gas in 1959-60 will be about 3% less than the original figure, and taking into account the amounts already spent, their estimate is £385 mill. The actual expenditure for 1956-57 will not be known until the Gas Council's accounts are published later in the year, but it is estimated at £52.4 mill., which is slightly in excess of the £52 mill. which had been approved. In the estimated capital expenditure for the 1956-57 and 1957-58 programmes (the latter totals £59 mill.) the amount spent on gas production is less than that spent on distribution and consumer service, in the first period by £7.2 mill. and in the second period £8.4 mill.

The National Coal Board estimated for the ten years 1956-65 that their total capital expenditure would be £1,000 mill., of which £826 mill. would be on collieries, £34 mill. on associated activities and £140 mill. on ancillary activities such as open cast mining, coke oven and by-product plants, central workshops, central stores, brickworks, etc. The expenditure on the collieries is principally needed to offset the natural losses in mining acitvies as workings become exhausted. The actual capital expenditure for 1956 was somewhat below that estimated, and was only £96 mill., compared to £106 mill. For the current year an expenditure of £107 mill. has been approved, £85 mill. of which is to be spent on colliery developments, £7 mill. on coke ovens and £15 mill. on other ancillary activities. Of the amount to be spent on collieries by far the largest proportion is to be for new sinkings. For the current year, this will be £63 mill., or 74%. Since the amount spent on colliery reconstruction covers projects in various stages of completion, the N.C.B. calculates that the return from this expenditure will spread over a number of years, but it estimates that some 30 collieries affected by reconstruction will show an increased output of two mill. tons in 1957.

In 1954 it was estimated that the demands on the Electricity Board's resources in England, Wales, and South Scotland (for which the Electricity Authority was then responsible) would rise from 15,800 MW to 22,000 MW between 1953 and 1960, involving a neces-

sary capital expenditure of £1,421 mill. In their last review, however, the C.E.A. and the South of Scotland Electricity Board have estimated that the demand would rise under ordinary cold weather conditions to 23,800 MW with an increase in necessary capital expenditure to £1,520 mill. The expenditure for the year 1956-57 will be known when the area boards publish their accounts later in the year, but it is estimated at £209 mill. and an expenditure of £233 mill. has been approved for 1957-58.

The change to nuclear power stations from the conventional type of generating station has somewhat increased the estimated amounts to be spent, but the effect of the new programme will not be really felt until the 1960's. In 1956-57, it is estimated that £108 mill. will be spent on conventional stations, and £3 mill. on nuclear stations, with £23 mill. on main transmission and £75 mill. on distribution, of which £7.5 mill. or 10% will be used for rural development. Of the £233 mill. authorised for 1957-58, £108 mill. will again be spent on conventional stations, but expenditure on nuclear stations will have risen to £12 mill.

Personal Notes

MR. A. AISHEN, Works Manager, and MR. E. B. MARSTON, Secretary, have been appointed Directors of Richmonds Gas Stove Co., Ltd. Mr. Aishen began his career with the Richmonds Company as a junior chemist 37 years ago, and has successively held the appointments of Chief Chemist and Technical Manager. Mr. Marston, who is a Director of Fletcher, Russell & Co., Ltd., has served the Richmonds Company for 26 years as Secretary and Accountant. He is a Justice of the Peace for the Borough of Warrington. MR. ARTHUR BROWN has been appointed a Director of Fletcher, Russell & Co. Ltd. Mr. Brown began his career as a junior chemist with Richmonds Gas Stove Co., Ltd., in 1913. Eight years later he transferred to Fletcher, Russell & Co., Ltd., and subsequently became Chief Chemist and Technical Manager.

MR. D. DALBY, who was appointed Manager of a works at Morpeth (Northumberland) in 1950, has been appointed Assistant Unit Manager for the Northern Gas Board at Alnwick. He succeeds MR. W. R. H. LORIMER, who has retired after 30 years with the Gas Board and its predecessors.

MR. H. D. A. YATES, of Humphreys & Glasgow Ltd., has recently returned from a six-weeks tour of the Far East. He visited the Company's branches and associates in Australia, Japan and India and had discussions with members of the gas industry in these places and in Hong Kong and Singapore. Much interest in the Far East at present centres round the use of oil as a raw material for gas making, and Humphreys & Glasgow are in the process of installing an Onia Gegi catalytic oil gas plant in Singapore, which will replace entirely the present coal gas plant and will make Singapore the largest gas undertaking in the Commonwealth using oil as the sole raw material.

Obituary

MR. ALFRED BAIRSTOW, of Sydney Street, Bingley, for 37 years on the staff of Bingley Council Gas Department, retiring in 1943, has died at the age of 79.

MR. WILLIAM FRASER (40), maintenance service superintendent with the Scottish Gas Board at Motherwell, has died at his home in Motherwell.

100 Women's Organisations Talk About the Clean Air Act

A BIG-SCALE discussion of the Clean Air Act was held in Edinburgh recently. It took the form of a one-day conference, arranged by the Scottish Committee of the Women's Advisory Council on Solid Fuel. Over a hundred women's organisations were represented.

Among the speakers were Mr. Ian Robertson, Department of Health for Scotland; Dr. W. A. Herald, of the Coal Utilisation Training Centre, London; and Dr. E. A. C. Chamberlain, Divisional Chief Scientist of the National Coal Board, Scottish Division.

In Brief

Speaking at a meeting of Newtownards (Co. Down) Borough Council, Mr. S. J. McWatters, chairman of the Gas Committee, warned that an increase in the price of gas was inevitable. The big increase in coal prices was responsible.

Because of increases in the cost of coal the Portrush (Co. Antrim) Gas Co., Ltd., has increased the price of gas by 3d. per 1,000 cu.ft.

South Shields gasworks which were built 133 years ago have been closed down, and the works are now being used only for storage purposes. The majority of the men who have become redundant have been offered work elsewhere.

The Directors of Baird & Tatlock (London) Limited gave their annual dinner to the staff at the Waldorf Hotel on March 26. During the evening gold watches were presented to Mr. W. F. Ellsmore and Mr. B. C. Webb, in recognition of 50 years' service with the Company.

Diary

April 24.—INSTITUTE OF FUEL: Institution of Civil Engineers, Great George Street, London, S.W.1. Presidential Adress. 5.30 p.m.

April 24.—WESTERN JUNIORS: Radiant House, Colston Street, Bristol. A.G.M. 2.30 p.m.

April 25.—INSTITUTE OF FUEL: Annual Luncheon, Connaught Rooms, Great Queen Street, Kingsway, London, W.C. Reception at 12.30 p.m. for luncheon at 1 p.m.

April 25.—NORTH OF ENGLAND SECTION, I.G.E.: Three Tuns Hotel, Durham. Joint Meeting with the Coke Oven Managers' Association, Northern Section. 'Co-ordinated Production in a Grid Area,' G. E. Anderson. 7 p.m.

April 25.—WALES AND MONMOUTHSHIRE JUNIORS: South Wales Area: Newtown, Montgomeryshire. A.G.M.

April 26.—MANCHESTER AND DISTRICT SECTION, I.G.E.: The Engineers' Club, Albert Square, Manchester. Seventh A.G.M. 2.30 p.m.

April 26.—SCOTTISH WESTERN JUNIORS: Gas Showrooms, 522, Sauchiehall Street, Glasgow, C.2. A.G.M. 6 p.m.

April 27. — LONDON AND SOUTHERN JUNIORS: Visit to Aldershot Distribution System.

April 30. — MIDLAND JUNIORS: Staff Mess Room, W.M.G.B., Birmingham. A.G.M. Address on "The Art of Public Speaking.'

INTERNATIONAL ROAD TAR CONF. WORKING PARTIES

THE working parties set up by the International Road Tar Conference met in London from April 3-5, to continue their studies on many aspects of the preparation and use of tar for the construction and maintenance of roads. Delegates from six countries attended.

Included in the programme, arranged by the British Road Tar Association, were road inspections in Surrey and Kent. Examples of surface dressing with tar-coated chippings, dense tar surfacing, and a demonstration of hot laid tarmacadam for road bases was seen by the delegates.

BALFOUR GROUP PLAN EXPANSION

Parent Company To Purchase 25-acre Site

NEW LABORATORY AND RESEARCH STATION

THE establishment of extensive new laboratories for the research and development of chemical and chemical engineering plant is now being planned by the Balfour Group of Companies. The parent company, Henry Balfour & Co., Ltd., has decided to purchase a site of approximately 25 acres, close to their existing works at Leven, Fife, for this purpose.

As well as the main objective of increasing the range of scientific plants for many industries, it is anticipated that the future industrial expansion of the seven companies comprising the Balfour Group will take place on this site.

GREATER RANGE

The arrangement of the initial building will be especially designed and laid out in order to co-ordinate current development projects and the housing of equipment from several existing laboratories within the group. A substantial staff of qualified chemists and chemical engineers, already operating in existing laboratories, will be engaged in research, and this staff will be augmented to take care of the greater range of work which it is anticipated will be undertaken.

The main bay will contain a comprehensive range of pilot plant and equipment for the processing of materials from which reliable design data can be obtained in the fields of evaporation, drying, distillation, extraction, absorption, size reduction, heat transfer, fluid flow, dust recovery, filtration, carbonisation, electrolysis, dispersion, mixing, agitation, and general chemical reactions. Special attention will be paid to materials of construction, and separate laboratories for corrosion, mechanical testing, chemical analysis, physical chemistry, metallurgy and radiographic examination are being installed.

SEPARATE BUILDING

In addition to 35,000 sq. ft. of laboratory and pilot plant space equipped with overhead cranes and all services, there will be conference rooms, library facilities, drawing office and design departments and a separate building for inflammable solvents, noxious gases and ionising radiations.

The Balfour Group specialise in the initial design, development and manufacture of chemical process plant. New developments reflecting the latest advances in physical and chemical science are being pursued, particularly in the fields of ultra high vacuum for molecular distillation, the construction of high temperature and pressure equipment for conditions approaching the limits of physical properties, and the use of ultra high frequencies to increase the rates of chemical reaction.

The proposed new laboratory and research station to be erected at Leven, Fife, for the Henry Balfour Group of companies.

In conjunction with this development programme, a scheme has been launched for the training of technical personnel in chemical engineering, mechanical engineering and chemical spheres. A five to six years student apprenticeship plan is envisaged, which will enable suitably qualified young men and women to reach full professional status, and, at the same time, obtain valuable practical training in industry, especially in the design and operation of a wide range of scientific process equipment.

OFFICIAL OPENING

The new laboratories, which it is hoped will be ready in June, 1958, for the official opening and the carrying out of the first tests, will greatly widen the scope of the companies' activities.

Cleanglow Sales Increase Steadily in North Thames Board Area

PRODUCTION of Cleanglow by the North Thames Gas Board commenced in October last year at Ascot and Lea Bridge works and resulted in it being available to the public in the London and greater London area through the Board's authorised distributors a few days later. In the initial marketing stage the Board decided that the policy would be to establish stocks at the works and in distributors' depots before any large scale publicity to excite public demand was embarked upon.

Sales of Cleanglow have risen steadily since its introduction and have increased six-fold over the initial 200 tons per week of last October. Latest figures available show the following tonnages sold per month: October, 1,231 tons; November, 1,618 tons; December, 3,197 tons; and January, 3,900 tons.

Even during the mild weather of February when sales of other solid fuels fell away, those of Cleanglow have been sustained at around 1,200 tons per week.

Reports indicate that after first small trial orders the public have followed by repeat orders for larger quantities. At the same time enterprising distributors are finding a good sale on selected trolley rounds.

Large-scale purchases of Cleanglow have been foreseen by the Board and several large users are being supplied by distributors under contract having transferred from house coal. Notable among them are the Government offices throughout Whitehall. London Clubs in Pall Mall, St. James's and Whitehall areas have shown great interest. Some have already changed and others intend to do so as soon as present stocks of house coal have been exhausted.

One building alone in the Whitehall area will be using approximately 150 tons of Cleanglow instead of house coal over the next fuel period. Many will undoubtedly follow suit.

Miners Compensated For Their Free Coal

Miners in areas where coal as a fuel is replaced by gas or electricity will be compensated for their loss of free or cheap coal which has been their perquisite, said Sir Patrick Dollan in Glasgow at a meeting of the Scottish Fuel Efficiency Committee, of whom he is Chairman.

Mr. Aird (right) presenting the Challenge Cup to Mr. L. C. Woodall.

R.A.M.S. GOLF TROPHY

REPRESENTATIVES from each of the competing teams in the annual R.A.M.S. Challenge Cup competition recently attended a dinner at the Trocadero Restaurant at which Mr. P. D. M. Aird, Deputy Chairman, Glover & Main Ltd., presented the trophy to Mr. L. C. Woodall, O.B.E., who accepted on behalf of the 1956 season winners, the Tottenham Golfing Circle.

At one time North Thames, Tottenham, and Radiation were nearly level and it seemed that North Thames would be the winners. In their last match, however, they lost to Watford —Tottenham and Radiation then headed the table with equal points.

As these two teams had played each other only once it was then agreed that they should play off to determine the outright winner. This keenly contested match resulted in a win for Tottenham by 2½ to 1½ matches.

N.G.B. Used 65% Less Oil in Fuel Crisis

HOUSEHOLDERS' SUPPLIES WERE MAINTAINED

ALDERMAN Joseph Hoy, of Sunderland, Chairman of the Northern Gas Consultative Council, revealed at Newcastle on Monday how the Area Board, compelled by the Suez crisis to economise, helped by industry and the trade unions managed to maintain supplies to householders on less than half the Region's normal fuel intake.

The Board normally estimated a seasonal November-March consumption of gas oil of 13,300 tons, but the Minister. said Mr. E. Crowther, Chairman of the Board, asked for this to be cut to 11,000 tons. The Board surpassed all hopes by using only 4,660 tons, equal to a cut of 65%.

The cuts were much assisted by three industrial committees centred on Tyneside, Wearside, and Teesside. The committees were formed on Wearside and Teesside during the crisis Representatives of industry and the trade unions worked together to get the most economical use of gas.

Alderman Hoy commented that the figures showed that the Board had done extremely well in carrying out the wishes of the Ministry in an emergency. Fortunately it had been a mild winter and gas consumption had not been as heavy as might have been expected in the North East of England.

As a result of the shortage the industry had learnt a great deal by way of economy, at the same time maintaining full production although more coal was allocated over the period.

That was an achievement which showed that an often-criticised nationalised industry could play its part in a national emergency and economy drive. The new committees would be maintained in the event of any future emergency which might mean the cutting of household supplies.

I.G.U. Discuss 1958 Meeting Programme

THE Council of the International Gas Union met in Neuchatel on February 28. The business sessions were presided over by Dr. Mario Beselli, President of the International Gas Union, assisted by Mr. R. H. Touwaide, General Secretary. The delegates of the national organisations of Austria, Belgium, France, Germany, Great Britain, Italy, Netherlands and Switzerland were present, as well as Mr. A. Baril, Honorary President, and Dr. W. T. K. Braunholtz, Mr. P. Mougin and Colonel H. Zollikofer, Honorary General Secretaries.

The Council noted the resignation of the Gas- und Wasser-Fachverband des Saarlandes, on account of its amalgamation with the Arbeitsgemeinschaft des deutschen Gasfachs.

The work done by the six international committees of the Union was the subject of detailed discussion.

The Council devoted an important part of its sessions to the programme of its 1958 Conference and particularly to the preparation of the numerous reports and papers which are to be presented by various countries. These reports cover the whole activity of the gas industry, including the production, distribution and utilisation of gas.

North Thames home service adviser Mrs. M. Stanley with Miss Viveka Hansen.

FRENCH COOKING BY GAS

WHILE French Fortnight was going on (it finished last Sunday) several of the gas boards took advantage of the opportunity to hold demonstrations featuring what that country has to offer in cooking.

North Thames, for instance, turned their Kensington High Street showrooms into an 'ideal kitchen' and on certain days held continuous demonstrations.

They also had the co-operation of their authorised dealers, the famous stores Peter Jones', John Barkers', Selfridges', and Whiteleys'.

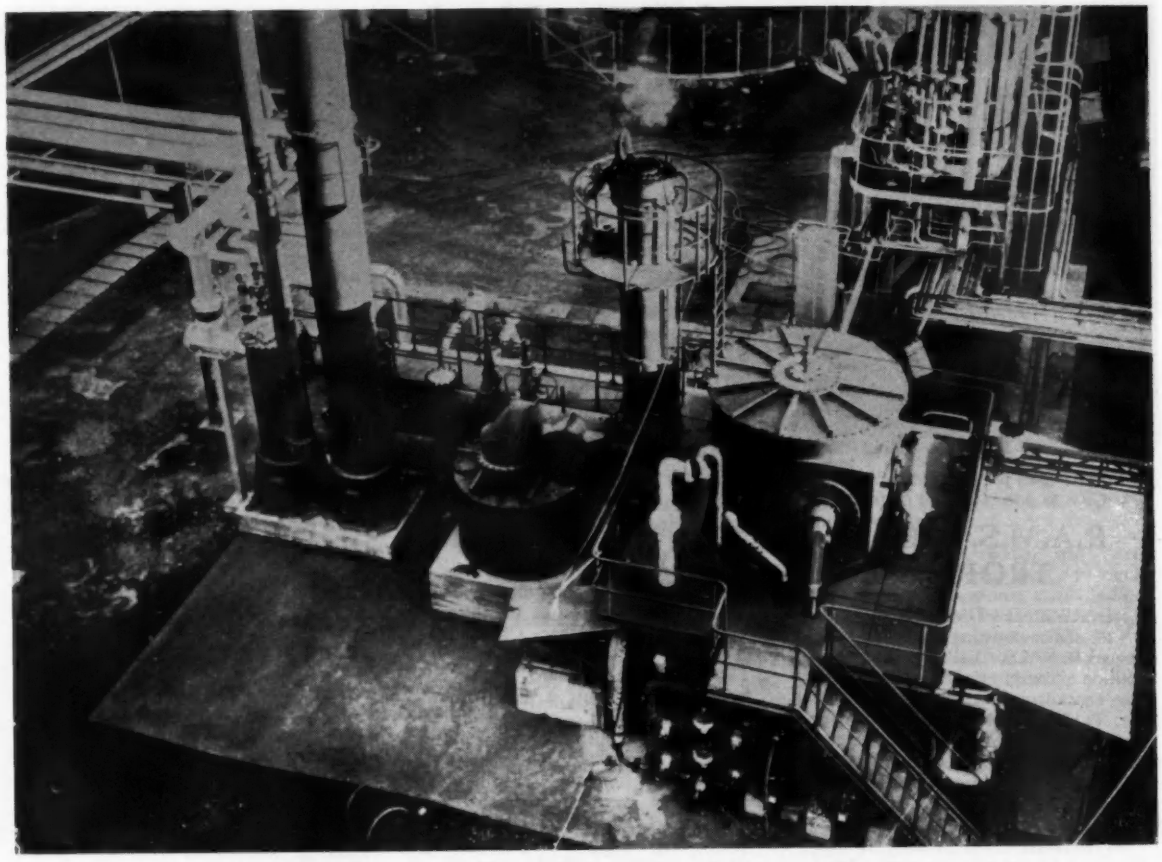
Our picture shows North Thames home service adviser Mrs. M. Stanley with Miss Viveka Hansen, who happens to be an adviser with the Copenhagen Light Company.

SIX MONTHS FOR THIEF WHO POSED AS METER MAN

WILLIAM JAMES MESTON (22) of no fixed address, was sentenced to six months' imprisonment at Halifax Quarter Sessions for posing as a North Eastern Gas Board meter man and stealing money from the meters.

He appeared for sentence, which was postponed at the January Sessions on a charge of breaking and entering a house and stealing £2 1s. 10d. from the meter, and a second charge of breaking and entering and stealing 10s. 9d.

It was stated that the day after Meston was released by the Recorder in January, he was arrested in Leeds after committing precisely the same offence, when he stole £2 17s. 5d. from a meter. For that offence he was in custody awaiting trial at Leeds Quarter Sessions.



Aerial view of Micro-Simplex installation by Gaz de France at Sète-La Peyrade. The triple tangential feed at the top of the generator is seen at the right, while to the left are the waste heat boiler (venting with flap valve open), low bubbler-type washer, and the tall spray scrubber. In the background is the bottom of a GASMACO regenerative reforming unit. Layout of four-unit system for propane feedstock and propane enrichment before distribution.

NEW FRENCH PROCESS FOR REFORMING L.P.G. IS LAUNCHED BY AMERICAN FIRM

AN ingenious and highly versatile new process for reforming LPG, refinery gases and other hydrocarbon feedstocks into fuels of manufactured-gas characteristics is being introduced by the United States Gas Machinery Company, of Cleveland, Ohio, in co-operation with Stein & Roubaix, of Paris, France, whose Pierre Gross is the inventor. The process is entirely automatic although inherently cyclic. Since both the generating and regenerating periods are measured in minutes, simple gas storage systems (or parallel arrangements of two or more reformers) give complete continuity of flow.

Known as the MS 17 Micro-Simplex process, and already tested and installed by Jean Reboul, of Gaz de France, in two other sizes and variations, the apparatus fills out the gas machinery line of reforming processes and supplements that company's GASMACO single-shell oil gas generators, CAR gas catalytic autothermic reforming units, and fully regenerative Hall-process systems. The Micro-Simplex will appeal to utilities for standby, make-up and special system usage, and to production industries who want their own high flame-velocity gas generators to reform available LP gas and refinery tails. Capacity appears to be limited to about 2 mill. cu.ft. per day.

In operation a nickel-bearing catalytic bed heated to proper generating temperatures, feedstock, air and steam are injected tangentially through a mixer at the top of the generator. These flow down through the generator to produce the resultant gas, later scrubbed and, if necessary, blended to specification.

The generating cycle is followed by a brief period of steam purging after which air and feedstock are supplied for a heating cycle to bring the catalytic bed temperature back to the proper control limit. Steam purge again ensues before another generating cycle begins.

The steam purge at the end of the generating cycle also transforms any free carbon formed during the combustion cycle into desirable gas constituents (by the water gas reaction). If sulphur, either organic or inorganic, is left in the bed during the generating cycle it is oxidised and purged during the heating cycle by simply injecting a slight excess of combustion air. The process is thus suitable for use with sour gases—a problem with other types of reforming plants.

The Micro-Simplex process is particularly flexible because four different parameters are independently adjustable—the cracking temperature during reformation, the duration of contact of reacting gases in the catalytic bed, the air-to-feedstock ratio, and the steam-to-feedstock ratio. Variation of any one influences the characteristics of the finished gas. For example, air-gas ratio can be used to adjust specific gravity; adjustment of reforming temperature will influence calorific value; and the two parameters may be manipulated to hold one characteristic at a desired level while the other is varied. Therefore, the MS system is useful when variations in the characteristics of the feedstock are encountered.

(*Continued on p. 142*)

From a paper to the Midland Section of the Institute of Fuel on March 28.

The Industrial Gas Service of the West Midlands Gas Board

By A. C. JENNINGS, M.Inst.Gas E., M.Inst.F.
INDUSTRIAL GAS OFFICER, WEST MIDLANDS GAS BOARD.

THE industrial section of the City of Birmingham Gas Department was established in 1909 largely for the purpose of advising manufacturing jewellers of the advantages of gas as a clean, easily controlled and adaptable source of heat for small melting pots and furnaces. In 1911 an experimental foundry was laid down at Windsor Street gasworks where tests were made on high-pressure gas burners for melting and alloying metals and experiments were carried out with new types of burners and other utilisation equipment. Thus began a progressive policy toward the use of gas as an industrial fuel which put the Birmingham undertaking in the forefront of the gas industry of this country. That policy was endorsed by the West Midlands Gas Board when it assumed responsibility on nationalisation.

Since May, 1949, steps have been taken to add to and improve the development and practical work of the industrial gas service by building and equipping a new heat treatment establishment at Adderley Street, and the conversion of the old heat treatment shops at Brasshouse Passage into spacious and well equipped premises, housing the industrial design and development sections of the Board. The importance of industrial gas sales to the Board may be appreciated when it is realised that sales of gas to industry in the Board's area amount to approximately 165 mill. therms per annum, or just over 50% of the Board's total sales. In the financial year ended March 31, 1956, the income from the sale of gas to industry was over £9.35 mill. The following breakdown of the total load of 165 mill. therms per annum may be of interest.

Trade	*Annual consumption mill. therms*	*% of total sales to industry*	*Location of major loads*
China and earthenware	31	21	North Staffordshire.
Motor vehicles ..	30	20	Birmingham, Coventry, Solihull, Smethwick, Wolverhampton.
Metal goods, precision instruments, jewellery, etc.	29.5	20	Birmingham, Black Country, Walsall.
Non-ferrous metals ..	16.5	11	Birmingham, Hereford, Bromsgrove, Dudley, Coventry.
Ferrous metals ..	16.25	11	Black Country, West Bromwich, Oldbury, Walsall, Birmingham.
General engineering	11	7.3	Board's Area.

These industries account for 134.25 mill. therms. The remaining 30.75 mill. therms are sold to the chemical and allied trades; manufacture of glass and glass containers; manufacture of food, drink, and tobacco; manufacture of paper and printing; and other miscellaneous trades.

The Board has some knowledge and experience of all industries in its area and this knowledge has been built up by the long experience of its technical staff since the industrial gas service was first instituted, together with information made available by the industrial centres of other boards. Nonetheless, research to develop new techniques in the use of gas as an industrial fuel and to widen the scope and efficiency is continual. New designs and the working out of consumers' requirements are entrusted to a competent staff of engineers; experimental work often yields valuable results and the department has devised many new methods and processes which have been the subjects of patents and made available to manufacturers under licence. It is a matter of policy that sole licences are not issued but manufacturers who can make adequate use of the ideas evolved are encouraged to do so.

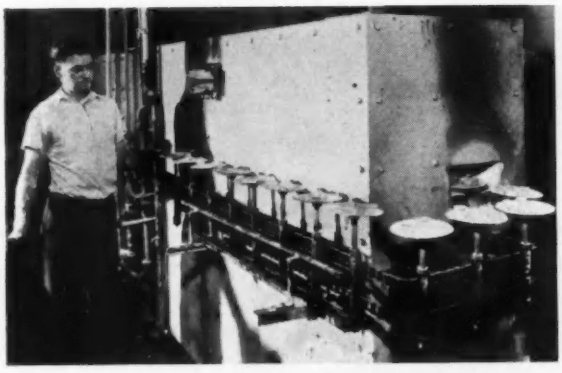
The number of design and development projects on hand by the industrial advisory service averages 50, and these are undertaken for the more important and smaller firms alike. The facilities of the headquarters advisory service are made available to industrialists through divisional industrial gas officers, who are responsible to their respective divisional general managers for the sales of gas to industry in each division. Contact with any gas office or showroom is all that is necessary to put the consumer in touch with the service. Problems so submitted are frequently capable of solution by the local staffs in the divisions, but where this is not possible, or the problem requires design or development facilities other than those existing locally, the query is submitted to the headquarters industrial gas organisation for which the author is responsible to the Chairman of the Board.

When a divisional industrial gas officer refers a problem to headquarters, a decision is first taken on whether it requires design or experimental development; if it does it is passed to the engineer who has a drawing office and a development laboratory under his control. If the required piece of plant can be designed on known principles, drawings are prepared and submitted to the consumer. If development is indicated it may be necessary for experiments to be carried out and for prototype plant to be designed and tested before it is possible for the drawing office staff to make working drawings of a full scale plant. Some of the work carried out in the development laboratory is done in collaboration with the Midlands research station of the Gas Council at Solihull. Also attached to the industrial headquarters department is a workshop with suitable machinery for the manufacture of prototype plant and certain special items of plant in connection with development work, all to meet consumers' precise requirements. Though the industrial gas service department makes prototype and special items of equipment, when anything with a general application emerges it is the policy to hand this over to recognised plant manufacturers for exploitation.

Steady Growth

During the first world war, the City of Birmingham Corporation Gas Department laid down a heat treatment section. Part of the plant was used for heat treatment of tank and aeroplane components, ammunition belts, and other war equipment. Between the wars, steady growth of the heat treatment section took place and production work was done for an increasing number of clients in the Midlands and as far away as Scotland and Cornwall. Tests for manufacturers who contemplated putting in their own equipment were continued and assistance was given to large local engineering firms whose plant was not always equal to coping with peak demands. By 1937 the section had attained considerable size and was dealing with a wide variety of heat treatment processes. It had been placed on the approved list of the Admiralty, the Air Ministry, and other authorities, now coming under the ægis of the Ministry of Supply. Towards the end of 1938 the section was moved to new and larger premises in Brasshouse Passage. This move was also part of a scheme to concentrate the activities of the industrial research laboratories, and in March, 1939, the other units concerned also moved to new premises in Brasshouse Passage.

The renewed call for munitions for the second world war inaugurated an even more intense period of activity. The new plant in Brasshouse Passage worked to full capacity day and night, seven days a week, and this work continued while



Conveyor side of lens heating furnace.

bombs fell on the city; the establishment fortunately was not damaged. The resources at Brasshouse Passage became inadequate to meet the phenomenal situation and additional emergency plant was erected by the Ministry of Supply at Mere Green and operated by the staff of the Birmingham heat treatment section.

During the most recent developments the heat treatment section has been removed from Brasshouse Passage to new premises specially built in Adderley Street, Birmingham, where it is well equipped to process and test materials submitted, both ferrous and non-ferrous. There is a range of furnaces of hearth areas of 8 ft. by 5 ft., 6 ft. by 4 ft., 3 ft. by 4 ft., and 3 ft. by 2 ft. as well as hot air circulating furnaces for the heat treatment of aluminium alloys, and stress relieving fabricated materials. Adequate quenching tanks are placed near to the furnaces and are cooled by normal heat exchangers and in one case a refrigerator. All the furnaces are equipped with control gear and modern safety gear, so that they can be used to demonstrate the latest technique in production and in furnace layouts. In the plant at Adderley Street, pack carburising is carried out but no salt bath carburising, on the other hand at another heat treatment plant at Coventry cyanide surface hardening is carried out. Half the work carried out is for the motor industry and some 200 propellor shafts for heavy lorries are often processed in a single day. Main drive axles for motor buses are also received in large numbers for heat treatment, while some of the most exacting work is done for world famous aero engine manufacturers. Extreme care is taken to ensure that the metals treated have achieved correct hardness and other physical characteristics and after heat treatment has been completed the materials are hardness tested by Brinell, Rockwell and Vickers machines. When necessary complete physical tests are taken from test pieces, heat treated with the materials concerned.

During the last war the City of Coventry gas undertaking set up a production heat treatment shop with premises at Kenilworth to demonstrate the use of gas for heat treatment and to fulfil the demand for a heat treatment service among the smaller engineering works in the Coventry area when industry was tooling up for armament production. A lot of the smaller engineering works were then receiving orders for light engineering parts which did not, in themselves, warrant the laying down of a full heat treatment plant. At Kenilworth the Coventry Corporation Gas Department shops were kept busy and this service was even more appreciated after the Coventry blitz, when a lot of existing heat treatment plant in the city was seriously damaged.

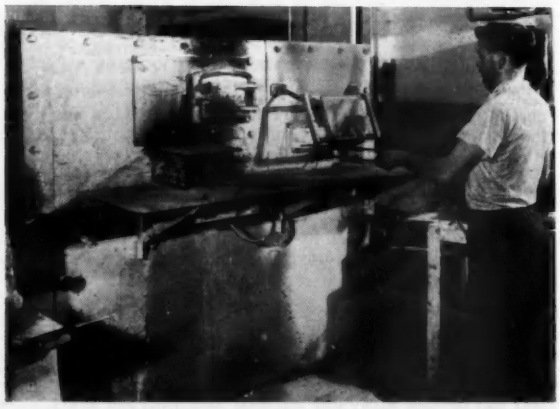
After the war when the question of dispersal no longer applied, it was obviously more economic for the heat treatment facilities to be more centrally situated, and premises belonging to the gas department in Abbotts Lane, Coventry, became vacant and were taken over to house the heat treatment shop and become the centre for the industrial gas service for the city. The heat treatment facilities were taken over on nationalisation and are now part of the industrial headquarters organisation and the work carried out is integrated with that of the Adderley Street shop. At Coventry there are oven type furnaces of various makes, all complete with automatic control and charging facilities, and hot air tempering ovens working in conjunction with them. There is also an installation of cyanide hardening furnaces not duplicated at Adderley Street. It is probable that segregation of such processes will be found to be more and more economical.

The availability of the heat treatment plants enables a useful service to be given to gas consumers during the interruption of production in their own works, consequent upon the installation or modernisation of furnace equipment, for while the firm's normal work is suspended, production can sometimes be carried on for the firm by the heat treatment section. The work at Birmingham heat treatment service is carried on by two eight-hour shifts a day, giving continuous operation during 16 hours a day for a 5½-day week. Although it would be impossible to attribute particular increases in gas consumption to the work of this service, the West Midlands Board leads the country in sales of gas for industrial processes and the Board has a distinction of having the only industrial centre with a heat treatment service. It is perhaps important to emphasise that although advice on heat treatment problems is given free, a charge is made for production heat treatment of components. In the same way, in connection with the work of the industrial department as a whole, advice on the use of gas for any industrial process and experiments in connection with prototype plant are also free to industrial users.

Generally, the work of the development section consists of applying known principles to new problems posed from time to time by the Board's divisional industrial gas officers who are in touch with consumers. In almost all cases the design calls for special consideration to the particular problem and it is not the sort of work that furnace builders would generally like to tackle. The overheads involved, on a commercial basis, would probably make the proposition uneconomic. On the other hand this work has to be done both for the good of our consumers and of the industry as a whole. Where a particular project has been developed and an appliance designed there is no objection to any furnace builder using this design, provided that by so doing he does not place in jeopardy the interests of the consumer for whom it was first designed. Our engineers have to be extremely careful to ensure that particular processes, which are the thoughts of the technicians of one consumer, are not passed on to a rival.

As an example of development work carried out, a conveyor type gas-fired furnace to heat blanks for optical lenses has been evolved by the Board in conjunction with a firm specialising in the manufacture of high quality projection equipment. (See illustrations.) The blanks were previously heated in an oil-fired furnace but it was found difficult to obtain the degree of control required and many lenses were rejected as a result of specks of dust and carbon settling in the surface of the glass. Optical glass of the weight and thickness used must be carefully pre-heated and 'shaped' prior to moulding and if the blanks are left at an elevated temperature for too long, the glass will run into a pool. In order to provide a controlled heating cycle a conveyor with variable speed drive was necessary.

The furnace consists of a pre-heating section, a high temperature chamber, and a pre-annealing chamber. The high temperature chamber is heated by air blast burners, fitted with a proportioning device and is maintained at a temperature of 1,000° to 1,200°C., according to the type of glass being moulded. Both the pre-heating section and the pre-annealing chamber are heated by the waste flue gases. The blanks which



High temperature aperture of lens heating furnace.

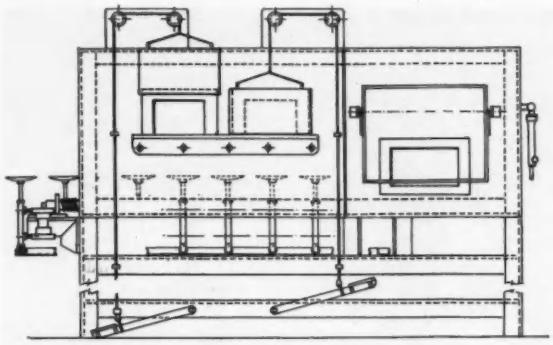


Fig. 1.

are cut from the sheet are placed on heat resisting metal pans attached to the chain conveyor. These pans pass slowly through the pre-heating section to the high temperature section where the blank is removed by the operator and roughly shaped before transferring to the moulding press. After moulding the lens is placed in the pre-annealing chamber in order to avoid any cracks or flaws developing. At the end of the shift the lenses are removed for annealing in a separate batch type furnace. Fig. 1 shows a general arrangement of the furnace evolved, while Fig. 2 indicates the type of brickwork used. Two types of insulating refractory, two types of full refractory, and full insulation are used.

Another example concerns one of our largest users of gas who recently installed a pilot production plant for the manufacture of synthetic rubber. This involves the use of butadiene which is extremely inflammable and heavier than air. On isolated occasions, during the operation of the plant, it is necessary to jettison some of the butadiene by means of a 16-in. diameter steel stack, 100 ft. high. As the gas is heavier than air it is essential that it is ignited at the top of the stack, and the problem of providing a permanent means of ignition at the top of this stack was put to the Board's industrial department. Essential design features of the apparatus demanded that the ignition burner at the top of the stack should remain alight and be absolutely reliable under all conditions of weather and be controllable both from the base

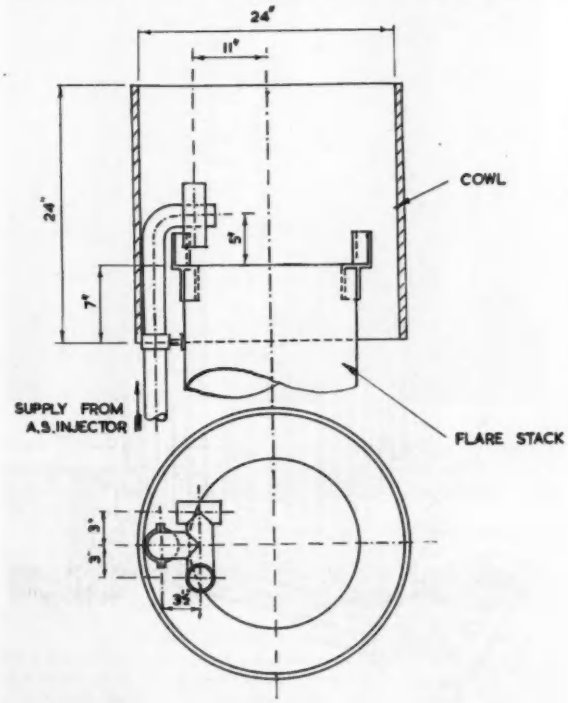


Fig. 3.

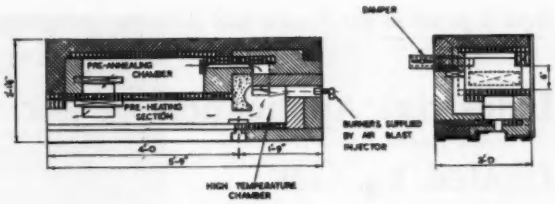


Fig. 2.

of the stack and a control point several hundred yards away. This operation should be independent of the services supplying the rest of the plant so that a plant breakdown would not affect it.

Figure 3 shows details of the burner used in conjunction with a welded cowl. The burner head has four outlets, arranged so that two are in the vertical and two in the horizontal plane ensuring that the flame stays on at least one of the ports whatever the direction of the wind these ports are cross lighting. Fig. 4 shows the general arrangement of the layout of the controls of the flare stack pilot. The air supply is taken from a different part of the works and is broken down from a pressure of 80 lb. per sq. in. by means of two reducing valves. These reducing valves are followed by a back pressure valve, a relief valve, and a normal constant pressure governor as used on most gas supplies today. Gas is supplied from low pressure mains through a constant pressure governor and back pressure valve and is controlled by a flame-proof solenoid valve. Dial type pressure gauges are included on both the gas and the air lines.

Considerable experimental work was carried out in the industrial development laboratory before the final arrangement was decided upon. In practice air is used at approximately 6 in. w.g. and entrains gas through a suitable device, the resultant mixture from this device being ignited in a flame-proof ignition box located at the bottom of the stack. The ignition of the mixture is by means of a high tension sparking plug and the ignited mixture travels up to the top of the stack so that the gas supply to the burner in fact becomes a flash tube. One of the difficulties encountered in the design of the flash tube was its height. As the point of combustion flowed up the tube it was followed by a quantity of spent products so that the live gas flowing up was sometimes a little too late to ignite. The difficulty was overcome by raising the mixture pressure. Electrical equipment for obtaining the first ignition is enclosed in a flame proof and explosion proof cabinet at the base of the stack and includes a standby battery in case of failure of mains supply.

There are now more than 60 projects under consideration including an intermittent pottery kiln, the drying of size on carpet backs, the singeing of pigs, hammer hardening, improving efficiency of 'glory holes' for the glass industry, design of back pressure valves, re-design of a chain making furnace, an appliance for burning out drums of chemicals, and the bending and annealing of glass discs. Much has been done over the last 30 years in the design of gas fired plant but finality has by no means been reached and the next 10 or 20 years will show improvements at least as big as those which have gone before. There are two trends in particular on which considerable thought is being given, and which may seriously affect design during the coming decade—the control of combustion by the use of primary air at temperatures above ignition point, and the use of high velocity high temperature product streams to give increased rates of heat transfer.

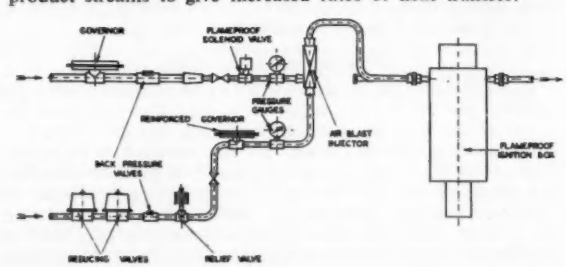


Fig. 4.

From a paper to the London and Southern Junior Gas Association, April 5.

Industrial Application of Air Heated by Gas

By H. R. COOKE, M.Inst.Gas E., M.Inst.F., A.M.S.E.

SENIOR INDUSTRIAL ENGINEER, SOUTH EASTERN GAS BOARD.

THE object of this paper is to give a few examples of the application of air heated by gas to industry in the area of the South Eastern Gas Board.

While practically every application is distinctive to the particular process, the main uses can be put under the general headings:

(1) Removal of natural moisture such as grain drying, ripening of fruit, bananas, etc.
(2) Removal of liquids used in processing goods or materials, such as laundry drying, skins, furs, plastic boards, etc.
(3) Removal of volatiles, curing or bringing about chemical or physical changes.
(4) Heating of buildings.
(5) Preparation of foodstuffs.
(6) Low temperature processing of steels, glass annealing, etc.

Air Volume and Temperature

When considering the installation of an air heating plant in a building, it is necessary to ascertain from the drawings produced the quantities and nature of building materials used, and the data concerning heat losses. Transmission of heat through various materials per unit area (known as 'K' figures as given in the Institution of Heating and Ventilating Engineers Guide, 1955) can now be applied and this together with temperature conditions will give the British Thermal Units required per hour. To this figure must be added the heat necessary to raise the volume of air required, which is usually recommended as two changes an hour. Finally, heat losses due to any external ducts, efficiency of heat exchanger, etc., should be added.

It is now possible to design the heat to provide the necessary heat input. Having arrived at the heat input required and working to a definite recommended air delivery temperature, the volume of air required to convey the heat units can be calculated. At this stage it must be mentioned that the heated air being delivered is usually partly recirculated, and the quantity being recirculated is determined in the original calculations to suit the particular conditions.

Heating Buildings

The plenum and extract system consists of one fan and set of delivery heated air ducts, while another fan and system of duct work is used to carry away heated and vitiated air. It is designed so that the relationship of output to input can be varied according to local requirements.

This system is necessary when dealing with public buildings where many people are congregated and tobacco smoke, etc., may be present. In the case of factory heating, the extraction duct and fan is not usually employed, there being sufficient air leak from the building to allow for necessary air change. In cases where offices, etc., are being heated a certain amount of fresh air may be introduced at the fan inlet.

Duct Layout and Sizing

When the volume of air required to be discharged into the building, and the delivery temperature have been calculated the layout of the duct delivering the heated air can be arranged.

For heating buildings, heated air is discharged at high level with velocity sufficient to ensure that it arrives at the walls and passes vertically downwards to floor level with absence of draught. The air is then brought back to the entry of recirculating duct. The position of the recirculation duct will be decided by the layout of room and its contents. The position of the heated air delivery ducts will be decided in some measure by the construction of the building.

Having decided upon the directional layout of the ductwork, it is now necessary to calculate the cross sectional areas of main and branch ducts. This will be decided by:

(1) Volume of air to be delivered.
(2) Velocity at which air can be conveyed in ducts.
(3) Velocity of discharge from orifices.
(4) Discharge pressure of air delivery, allowance for resistance encountered in ducts, bends, etc.

In all instances it is best for many reasons to arrange for the minimum velocity of air in the main ducts. For large industrial premises, where some noise is tolerable, high velocities may be used, but a figure of from 1,100 ft. up to 1,800 ft. per minute is preferred for smaller premises. However, in other premises where the noise level is important lower air velocities must be

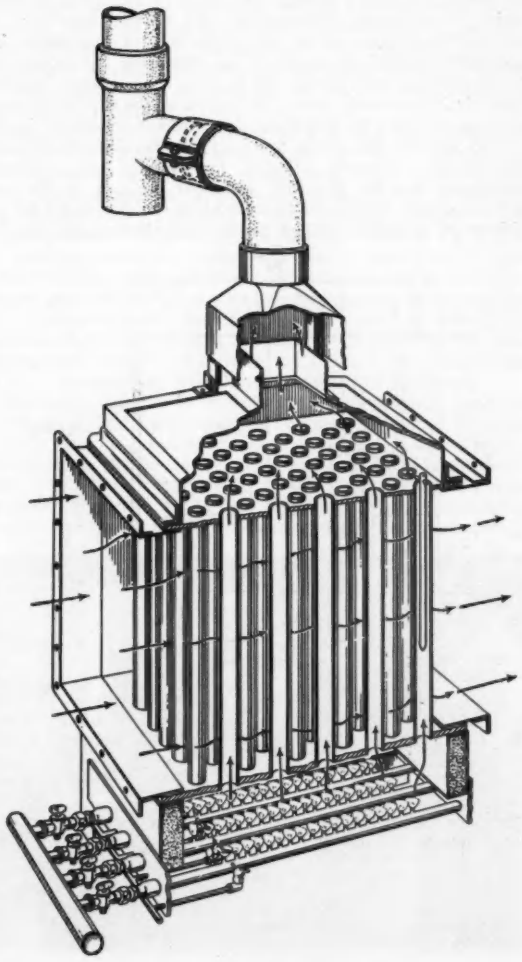
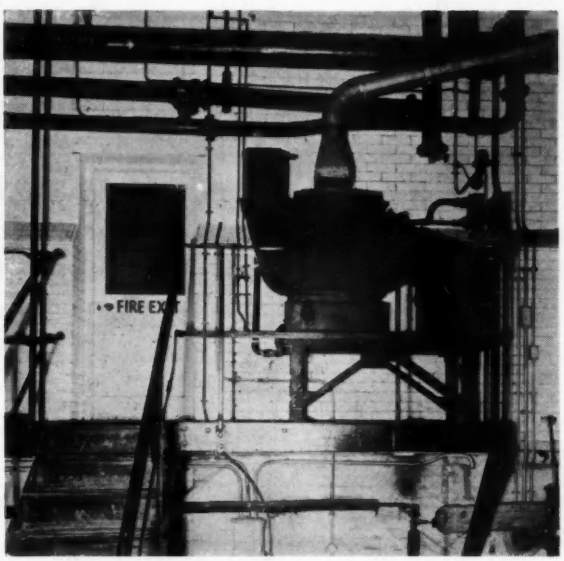


Fig. 1.

Left: *Factory air heating installation, showing overhead duct.*

Left, centre and below: *Laboratory installation. Hot air is discharged from duct orifices at high level. Below, left, the main duct is shown entering through wall. The room temperature thermostat is seen on the right hand wall, while over the door the entry to recirculating duct can be seen.*

Below: *Showing the air heater, fan and motor fitted outside the laboratory.*



used. This also applies in examples such as laboratory heating where light powders are used on the benches and where delicate balances are exposed, as shown in the laboratory installation to be discussed.

Discharge velocities from orifices in factories, although important, are not so important as in offices, or in certain factories where very light materials are handled. In these cases a discharge velocity of 600 ft. up to 850 ft. per minute might be considered.

The design of duct outlets, also dampers in ducts, requires very careful consideration. I have met instances where the air discharge duct is of rectangular formation, heated air being discharged through rectangular holes in the side of duct, and an internal curved plate being fitted inside the duct which not only acted as a directional discharge place but was also intended for use as a damper by bending to the required position to reduce air flow to orifice.

I feel strongly on this point, since the discharge velocities having already been calculated, any alteration in areas will not only bring about a change in the volume being discharged, but also in velocity, which may affect the coverage of the space being heated by the air and bring about uneven or patchy heating. If the duct delivery has been correctly designed the discharge orifices can be of definite dimensions and consist of slightly outward-curved branches. Should dampers be necessary completely to close any section, a slide damper parallel to the side of the duct will serve the purpose. Sometimes, owing to some alteration within the building, one small section may not require the original volume discharged from perhaps one or two orifices. In this case discs may be fitted to the actual orifice. In special instances, such as offices and process work, where dust must not be deposited on the work, the incoming air is passed through filters before entering inlet of fan.

Elimination of Noise

When designing an installation care must be taken to eliminate wherever possible undue noise, particularly in offices, etc.

Sizing of air delivery ducts will be determined by the volume and velocity of air to be delivered; regarding the shape of the duct which for appearance, headroom and to meet other local conditions is usually of rectangular formation, it should be stated that for equivalent cross sectional areas the circular duct

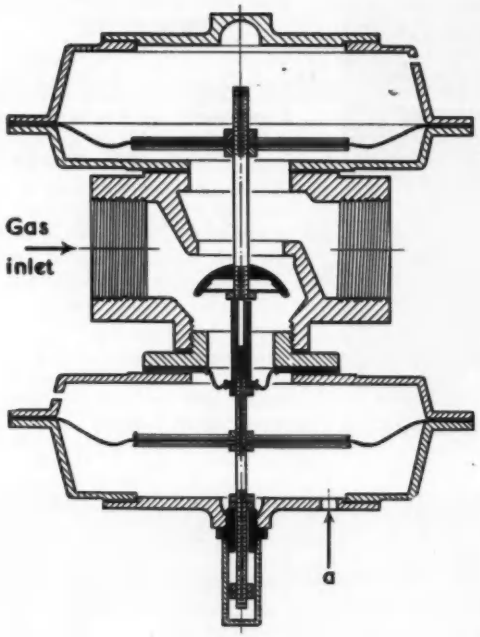


Fig. 2.

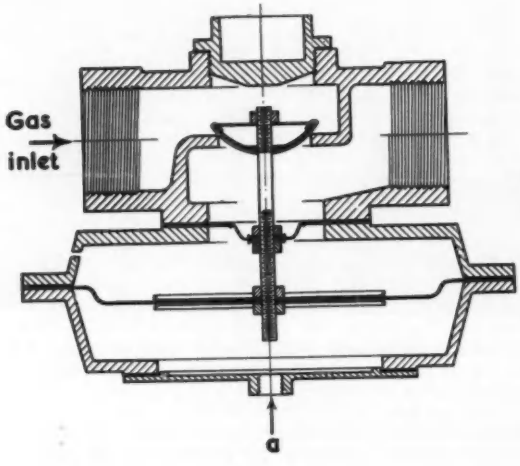
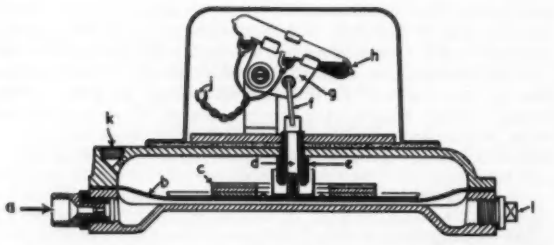


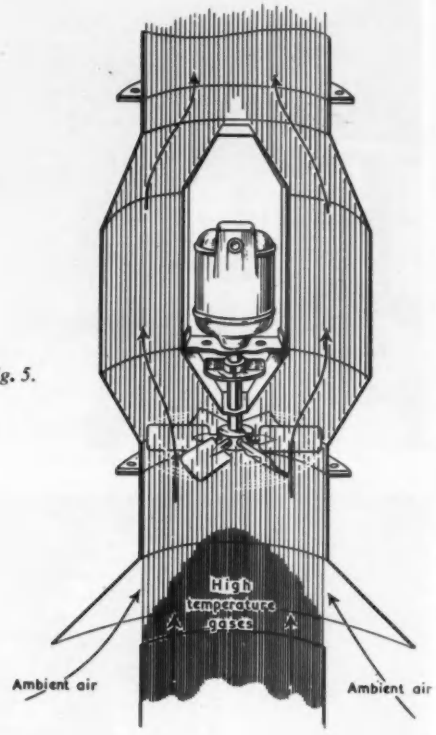
Fig. 3.



a. Gas inlet
b. Leather diaphragm
c. Weights
d. Operating stem
e. Stem guide
f. Link
g. Rocker
h. Mercury contact switch
j. Leads to terminal block
k. Vent
l. Test point

Fig. 4.

Right: *Fig. 5.*



offers less resistance to air flow, less metal is required in its manufacture, and where appearance is not important and space is available is slightly cheaper to install.

The most common causes of noise in the air heating installation are, turbulence of air flow due to design of bends, branch ducts and also the air inlet duct to fan which, if not correctly designed, will produce air surge with consequent noise. Care should be observed, when making rectangular ducts of large size, to ensure that the gauge of metal used is sufficient to prevent vibrations being set up by air flow. Where mechanical noises due to vibration are present special attention will be required. With the fan, where it is necessary to reduce noise to a minimum, the following steps should be taken:

(1) Reduce impellor speeds—this will mean using a larger fan with slow running impellor.
(2) Use a fan where the inside of the casing and the impellor has been coated with a sound absorbing material.
(3) Fit flexible connections between fan and heater, also between heater outlet and main air delivery duct.
(4) Mount fan and motor and heater stand upon sound absorbing material to prevent vibrations being transmitted to structure of building.

The heater generally used for the heating of buildings is of the indirect gas fired tubular type, designed to provide air which has been heated without coming into contact with the products of combustion. (Fig. 1.) The heater consists of a tubular heat exchange unit comprising 1¼ in. outside diameter 13 gauge cold drawn weldless steel tubes expanded into a top plate of ⅜ in. mild steel and a bottom plate of ¼ in. mild steel. The tubes are arranged in staggered formation. The tubular heat exchange unit is housed in an outer casing of 12 gauge mild steel, having inlet and outlet connections suitably flanged for attachment to inlet and outlet ducts. The incoming air is passed horizontally into the casing, heated by contact with the heated tubes and finally passes via the outlet into the heated air delivery duct.

Beneath the base plate of the tubular unit a combustion chamber is formed, in which the burners are housed. The combustion chamber is lined with suitable heat insulation refractory. The burner tubes are fitted with non-aerated jets (industrial type) and each is separately controlled and connected to a common manifold. Heated products from the combustion chamber pass upwards through the tubes to the top of the

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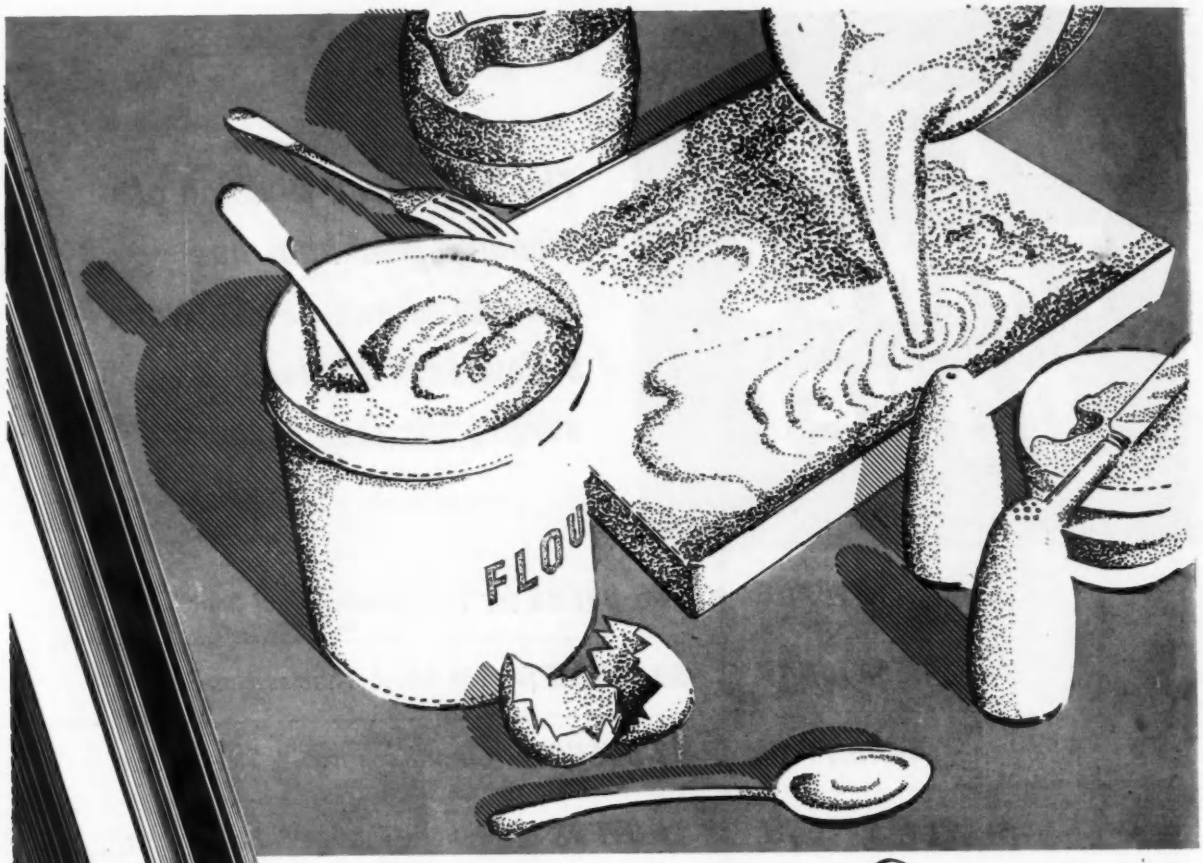

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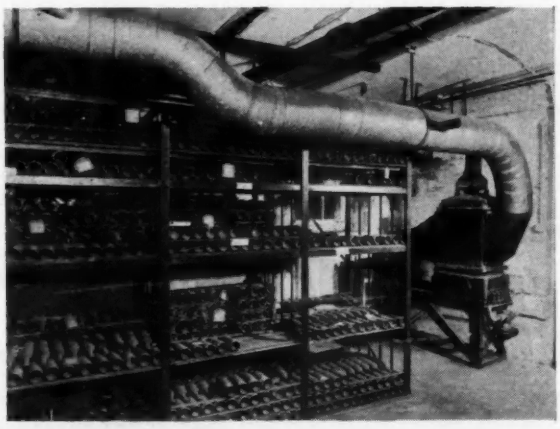
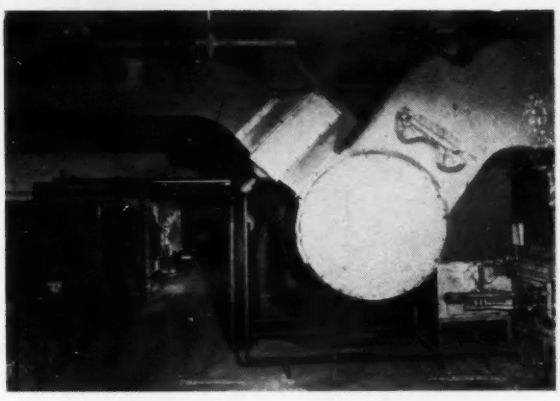
Left: *Installation for drying donkey jackets, etc. This is the tubular air heater fitted outside drying room. The heater is an early type where air is passed in two streams across the tubular unit.*



Top, right: Wine *vaults, where the temperature is kept constant at 56-60°F. by heated air. The heater unit and main discharge duct is shown.*



Below, right: *Skin and fur treatment. The picture shows a gas-fired air heater used as an auxiliary to an air heater which is normally heated by steam.*

heater, collect into a gathering hood and finally pass to the outer atmosphere by means of fluepipe. A short piece of $\frac{3}{8}$ in. barrel is suspended in each tube, which acts as a retarder to the flow of heated products, increasing the thermal efficiency.

This heater is used for air delivery temperatures up to 150°F. When air delivery temperatures above 150°F are required the heater as described and shown in Fig. 1 has been developed so that the air being heated makes either a double or treble pass through the heater according to the delivery temperature.

Factory Heating Installation

An installation which I will now discuss is in a large single-storey factory engaged in the manufacture of lingerie and similar articles. Only female operatives are employed and the work requires close attention. The walls are mainly glass throughout the whole length of the building. The operatives must work in comfortable surroundings and much of the material used must be kept in a constant temperature of 65°F., within close limits.

The heater was installed on the side wall and the main discharge duct was fitted at high level, having spouts which discharged heated air fitted at each side. This plant is fitted with automatic clock control, with pre-selective timing.

Laboratory Heating Installation

It is often considered that the air heating system is unsuitable for laboratory use, but such an installation as the following can be successful. The heater consists of a tubular gas fired air heater, as described above and illustrated in Fig. 1. As sufficient space was not available within the laboratory, the heater had to be installed outside the main building. As floor space would not be used, therefore, it was necessary to arrange for a special gantry extension to be made to accommodate the heater, fan, etc., at high level. The siting of heaters is often very difficult, for no factory wants to take up floor area which may be used for production or storage space, and we are, therefore, often asked to install heaters in very difficult places. (The author gave some examples of the methods used to overcome the problem. In passing, he said, it should be stated that the heaters may weigh from 250 lb. to 4,000 lb. or more, the corresponding weight of the fan and motor being from 200 lb. to 900 lb.)

Reverting to the laboratory installation, the heated air discharge duct was taken from the heater outlet and led through the wall into the laboratory at ceiling level. Spouts for discharging heated air into the laboratory were taken from each side of the duct.

Air being recirculated is led back to inlet of fan, re-heated and circulated to main discharge duct. The thermostat for controlling air temperature within the laboratory is fitted to the side wall. The discharge air temperature from the spouts is 120°F., the room temperature required is 65°F. when the outer temperature is at 32°F. The temperature throughout the laboratory varies very little at all levels. In this particular case the heating is turned off at night; therefore, the plant is designed to raise the temperature within the laboratory to 65°F. in one hour when the outer atmospheric temperature is 32°F. Particular care had to be observed to ensure that fine powders, etc., would not be disturbed by air movement. This installation has been in continuous use for over 20 years and is still giving satisfaction.

Food Production Factory

When the question of heating a food production factory was raised, the consumer required a minimum temperature of 65°F. in one section used for icing cakes. On the third floor, where operatives were engaged in wrapping and packing, heat was required for comfort conditions. Another packing room also required heat. There were parts of the building containing conveyor ovens. The heat these provided was used to supplement the gas heater. There were rooms where no heat was needed, so very careful consideration had to be given to the layout of the ducts.

The heater, as Fig. 1 again, was rated at 640 cu.ft. per hour, the volume of air circulated was 3,750 cu.ft. per minute and

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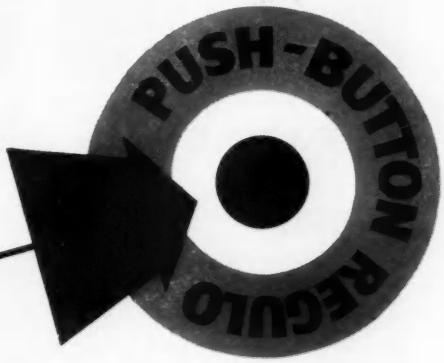

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the air delivery temperature was 120°F. Four controls I would like to mention are important to this type of installation.

Combined Gas Control Valve and Governor

The control valve consists of a constant pressure governor of the diaphragm type with an additional diaphragm chamber attached to the base of the valve body, a small isolating diaphragm being inserted between the valve body and the lower diaphragm chamber. To increase sensitivity, the lower diaphragm is usually a size larger than the diaphragm chamber of the governor. A spindle passes through the isolating and lower diaphragms, and through a bush at the base of the chamber. A sleeve is formed in the upper end of the spindle into which the lower end of the rod carrying the governor valve fits and is free to move up or down according to the requirements of the governor.

At the lower end of the spindle are four locking nuts; two inside, to control the downward movement and two outside to control the upward movement of the control diaphragm. The two outside locking nuts are adjusted for the minimum amount of gas passing uncontrolled to the gas consuming apparatus. A small gas connection is made between a weep, taken from the inlet side of the valve, and a tapping at the base of the control chamber ('a' Fig. 2) a tee being inserted in this weep supply and a connection taken to the thermostat.

Under normal working conditions the governor is weighted to give the desired initial gas pressure to the appliance. As the temperature in the building, or process, rises, the thermostat closes causing an increase of gas pressure under the lower diaphragm. When sufficient pressure has been built up, the lower diaphragm takes control of the gas valve. A position is finally reached which will give the correct setting of the control valve, a position in which the heat input balances the heat losses and maintains the steady desired temperature. This valve has been modified to suit several other applications apart from the control of gas fired air heating plant or processes.

Air Controlled Gas Valve

The air controlled gas valve functions in the following manner: Connection is made between the air delivery side of the fan and base of valve ('a' Fig. 3). When the fan is operating and air is being delivered to the air delivery duct, air pressure is communicated beneath the large diaphragm which rises and in so doing lifts the gas valve off its seating allowing gas to pass to burners. Should for any reason the air supply fail then pressure is released from beneath the diaphragm and the gas valve falls by gravity on to its seating and the gas to the burners is cut off, thus preventing the consequent damage arising from overheating of the heater, etc.

Pressure Operated Control Switch

With the pressure-operated control switch, as will be seen in Fig. 4, the rocker, which carries a mercury contact switch, is actuated by means of a link and operating stem which is attached to the diaphragm. Thus, when gas enters at A the diaphragm is raised tilting the mercury switch, completing an electrical circuit to the motor. The reverse occurs when pressure is relieved from beneath the diaphragm.

Bifurcated Fan

In this particular instance the flueways leaving the heater had to run for some distance in horizontal plane and this created difficulties in ventilation of the appliance. We therefore decided to use a bifurcated fan for removing fumes and products of combustion. This fan is suitable for mounting in any position and is also waterproof and, therefore, suitable for outside mounting without weathering of motor. It has also been used in cases where it would have been very difficult and expensive to remove flue products.

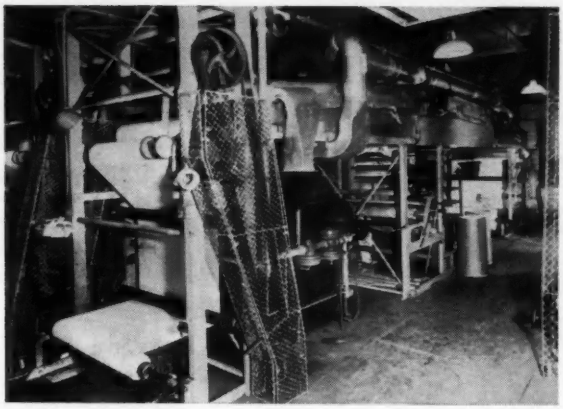
As will be seen in Fig. 5, the fan is formed around the motor thus, should the fan for any mechanical reason fail, an uninterrupted passage for the flue gases is provided. The fan can, if desired, be wired in series with the main air delivery fan one starter thus controlling both fans.

Difficulties

I would like to mention one of the typical difficulties which arise when the original purpose for which the heating installation was envisaged is altered by a change of process within the factory.

In this instance, a printing establishment which had adopted our air heating system later changed to three-colour printing processes. This presented several difficulties since where colour printing is carried out, conditions of relative humidity have to be closely followed and maintained. The machines are set up for the first colour and all copies run off, which may take hours or even days. The machine is then prepared for the second colour and the copies, now dry, are again run through; the process being repeated for the third colour.

The edges of each colour must not overlap. Seldom are the skilled machine minders guilty of incorrectly lining up the machine, so that usually the only reason for overlap is the expansion or contraction of paper due to absorption or removal of moisture. This may be due to maintaining a given temperature of the air without due regard to the effect upon the relative humidity. In other words air heating, and air conditioning, are called for in order to maintain a definite number of grains of moisture per cubic foot of air at the required temperature. This type of installation represents heavy installation costs and such an enquiry would be dealt with by firms who specialise and cater for this requirement.

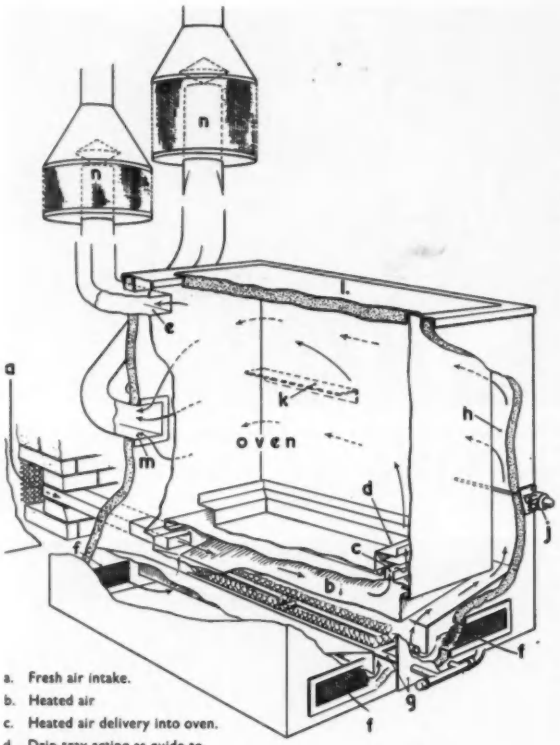


An air heating installation used for drying coated paper. Dry rolls of paper seen on right are coated with a liquid, passed through the horizontal chamber in contact with heated air, and finally rolled off in a dry condition at left hand end of dryer.

The drying of spray painted metal parts. The picture shows the oven formed between the brick walls of the building. The air delivery ducts will be seen along the roof of the oven passing down each side and discharging at low level into the oven. A vent to outer atmosphere is provided in centre of oven roof.

Laundry Drying Installation

An installation which is used for drying donkey jackets worn by men unloading ships at a wharf during bad weather, is also used for drying overalls and similar laundry work. In order to conserve floor space in the laundry, the fan and motor were mounted above the heater. The tubular heater is of an early type where the air is passed across the heat exchange unit in two streams, each stream being independently controlled by the adjustable dampers at the side of the heater casing.



a. Fresh air intake.
b. Heated air
c. Heated air delivery into oven.
d. Drip tray acting as guide to heated air.
e. Mixed air and vapour outlet to outer atmosphere.
f. Air inlets to burner through double safety gauze.
g. Burner and burner plate (see photo above).
h. Space for products of combustion.
j. Thermostat.
k Baffle.
l Removable cover.
m. Discharge of products of combustion to outer atmosphere.
n. Draught diverter fitted with double safety gauze.

Oven for the purpose of polymerisation, also for driving off volatile from impregnation varnish.

Other installations described and illustrated by Mr. Cooke dealt with the storing and maturing of wines, skin and fur treatment, coated paper drying, drying painted metal parts, spray room drying, and an oven for polymerisation and driving off volatiles from impregnated varnishes.

Oven for Polymerisation

The author went on:

This is an example which shows that each requirement must be considered as an individual problem. This oven was designed as an answer to a problem where it was required to raise and maintain the temperature of transformer coils for the purpose of polymerisation, also for driving off the volatiles from the varnish with which they had been impregnated. The impregnation fluid contains a volatile having a low flash point of about 70°F. Therefore, air change was definitely required to remove this from the oven.

It was, however, known that the value of the transformer coils at this stage was such that spoils could not be tolerated, also the control of temperature was important. Further, in view of the long processing time which would be required, the installation could not be given personal attention all the time. It was decided to design an installation which would be as free as possible from mechanical or power failure. An air heater was formed at the base of the oven having an air inlet connection from outer atmosphere. A double bar burner fitted with non-aerated industrial type jets is fixed beneath the air heater, and heated air passes from the heating box into the oven and is discharged from the oven at high level and passed to outer atmosphere by means of suitable flue. Heated products of combustion pass around the oven and are finally exhausted from bottom flue outlet.

The temperature of the oven is controlled by means of a thermostat fitted into the flueway, thus ensuring that the temperature of the walls of the oven do not rise rapidly while the oven interior air temperature rises slowly. In this manner the volatiles are heated and driven off at low temperature, the oven finally reaches a temperature of either 230°F. or, for another process, 392°F. The pressure at which the burner operates is 18/10 in. w.g.

The results obtained by this oven are considered to be much more economical than would have been obtained had mechanical circulation of heated air been employed. Also, the only possible fault which might occur which would interfere with production would be due to the flame failure device.

Development

In addition to using air for such processes, it also plays an important part in low temperature heat treatment. In industry the process must be strictly controlled as to the time and temperature required for the operation, and reliability of the product. Perhaps from the economics point of view the most important factor is the absence of spoils, including high labour charges and the cost of raw materials.

The term drying in itself should be more clearly defined as a condition of moisture content required in the final product, which may be as low as 2%; more usually, however, 5% may be considered as the minimum. In some cases it may be in the region of 17% to 25%. Conditioning of materials will depend upon the actual materials and their intended use. Reducing moisture content may be carried out rapidly or very slowly depending on the nature of the material. With timber, the removal of moisture is a very slow process, and heated air containing a large amount of moisture may be needed to prevent rapid drying and case hardening while the core is still moist (which would produce warping and general distortion). The drying chamber is sometimes steamed for a period and the drying or removal of moisture is then very slowly carried out.

When dealing with sludges, wet pastes, etc., again the drying rate must be controlled very closely, otherwise skin drying of the surface will result in leaving a moist inner core. Thus the outer dried layer will prevent moisture release until the surface cracks and then only a restricted surface is available for moisture removal.

At the other end of the scale, we have instances where the removal of volatiles, etc., is called for. If carried out quickly the air which is used may be as dry as is possible and at a temperature safely used without promoting fire risk, or spoilage due to heat effect such as warping or shrinking.

When drying chemicals the temperature at which physical changes are brought about must be carefully considered, some decompose at temperatures below 100°F. while others remain unaffected at temperatures up to 1,000°F. Other materials may contain substances which liquify upon heating thus increasing the initial moisture content to be removed.

In this paper the mechanics of drying cannot be discussed in detail as time or space would not permit it, but the general conditions which have to be observed in principle are:

(1) The total weight of material and the moisture content must be known. If these are not available various methods can be employed, the simplest being by difference of weight after subjecting samples to heat treatment.

(2) The specific heat of the material must be known.

(3) The physical limitations due to heat effect must be ascertained and the required moisture content of the finished article known.

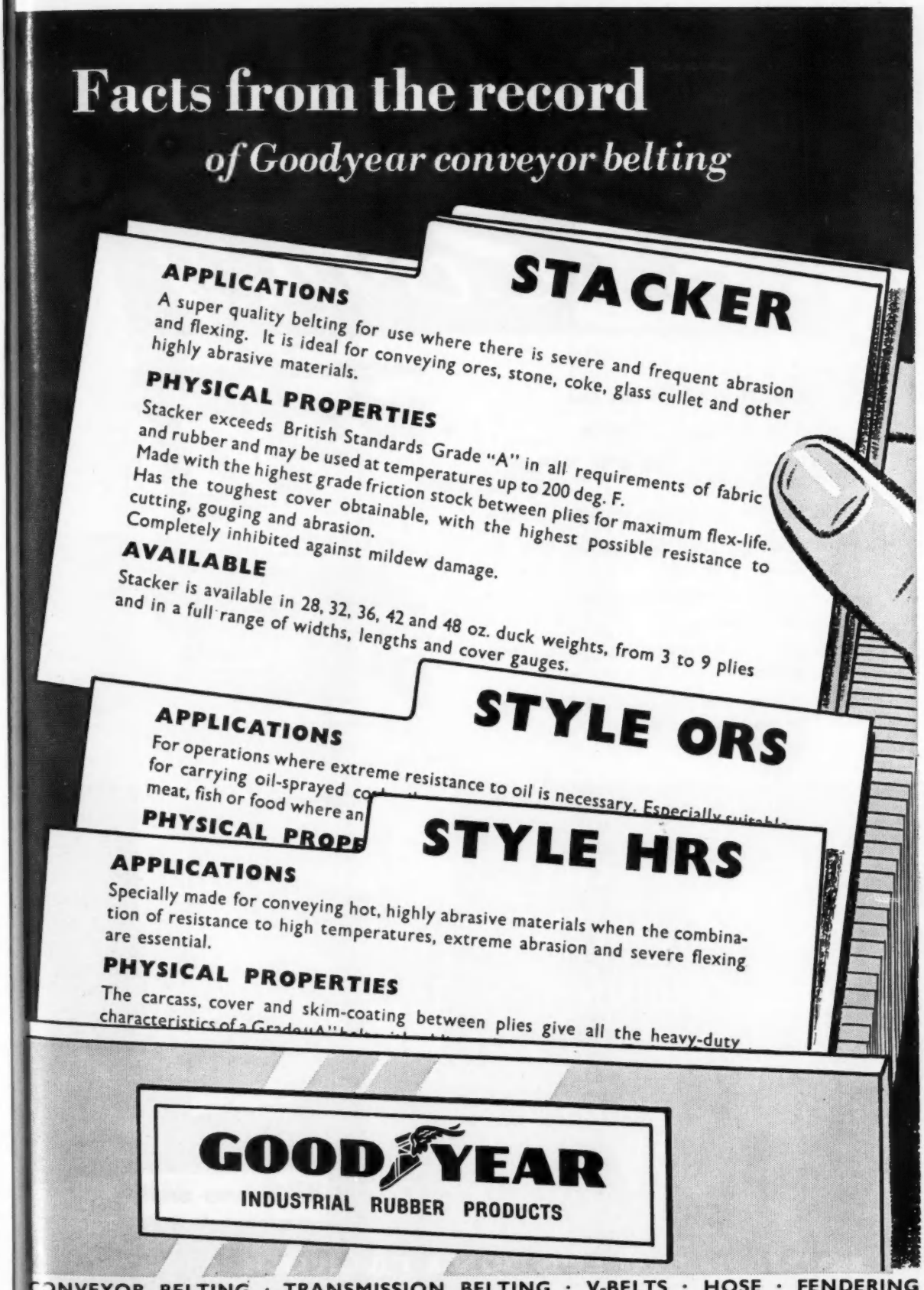
(4) The nature of the untreated material, method of handling, etc., must be known.

The next consideration must be the method to be employed. This can only be decided upon after close study of the final requirements. When the thermal requirements, the moisture to be removed and the volume of air required at a certain temperature, also the thermal capacity of the oven, carriers, etc., are obtained, it is possible to design a heater to give the thermal output required. The type of fan to be employed, its capacity, etc., may now be selected.

The velocity of the heated air which will best suit the material being handled must now be calculated. For instance, with drying powders or light materials great care must be exercised with regard to discharge velocities. With the foregoing data,

Facts from the record

of Goodyear conveyor belting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the main duct area and the cross sectional areas of the discharge ducts may be ascertained. Finally the manner in which the heated air is to be discharged into the oven or drying room can be decided upon.

DISCUSSION

Among those who took part in the discussion was **Mr. W. Johnson,** Industrial Service Officer, South Eastern Gas Board, who said industrial papers were of three classes: The straightforward reporting of industrial installations, giving detailed description, but little about results achieved; the paper which was the result of laboratory investigation, which might not be of immediate practical use and perhaps only covered a limited field; and occasionally the paper like Mr. Cooke's, where the author told something of the work he had done himself.

Air had, of course, a very wide range of uses and Mr. Cooke could only have covered a few examples. 'In addition,' said Mr. Johnson, 'I may take him to task over not including in his paper some of his experiences of his use of hot air for heat treatment processes for very important individual uses.'

The Gas Light and Coke Company always had a different approach, and this was one of the examples where they did a good job of work—pioneering the use of hot air by gas. Hot air, of recent years, had found itself very much in competition with radiant heating for drying processes. There was a time when this method of radiant heating was used for processes for which it was unsuitable.

Mr. D. R. Wills, Watson House, asked whether heating entirely by warm air was the best way both in regard to conditions produced and fuel economy.

'First,' he said, 'it must be remembered that air has a very low heat carrying capacity. Therefore, if both the ventilation and fabric losses are to be dealt with by warm air alone it could mean either high outlet temperatures or large volumes or both.

'If high outlet temperatures are used this can often lead to abnormally high temperature gradients, with attendant higher heat losses and a lower level of actual thermal comfort. I would mention that a 10°F. vertical temperature gradient means about a 10% increase in thermal loss compared with zero gradient. To reduce temperature gradient effects it is advisable to employ a large measure of recirculation and deal with large volumes of air at lower temperatures. In fact with air heating it is always better to keep the outlet temperature as close to the final required temperature as possible, consistent of course, with other factors.'

Mr. Wills concluded: 'There is little doubt that there exists a need for a closer study of factors which can improve efficiency, such as degree and method of recirculation, the arrangement of the stock to be dried, greater uniformity of air distribution, insulation, the possibility of some heat regain, etc.'

When other contributors had spoken, including **Mr. E. W. A. Atkins,** Manager, Special Service Department, South Eastern Gas Board, the author made replies to each of the main points.

NEW L.P.G. REFORMING PROCESS

(*Continued from p. 126*)

Gases of heating value in the neighbourhood of 472 B.Th.U. per cu.ft. (and down to half that value or below) and specific gravities as low as 0.5 and as high as 0.63, are feasible. Higher heating values are possible through enrichment (as shown in the diagram). High hydrogen content and low nitrogen dilution yield excellent gas characteristics for hot-flame and heat-treatment applications, and sure burner operation in any industrial, commercial, or domestic appliance.

Control is both by time cycle and pyrometry. In the original paper on the process (presented by Reboul and Gross at the 1956 meeting of Association Technique de L'Industrie du Gaz in France) the control system is described as 'pyrochronometric.'

A series of eight commutator-type timing discs actuate contactors arranged in a double-delta or bridge-type circuit, to open and close pilot valves for the four-step cycle. The timing at each of the eight discs is set by the process engineer, but the permissibility of actions caused by this 'keyboard' type of control is regulated by thermocouples at selected control points within the catalytic bed. Thus the reformer-bed temperatures suitable for generation and reheating are controlled within narrow limits. In modern instrument terminology the system could be referred to as a 'modified-time-cycle and anticipating system regulated by process temperature.' Fast response and compactness of the control system are assured by using electric pilot valves actuating powerful pneumatic operators for the stream valves.

The process is particularly suitable for waste heat boiler applications. Thermal efficiency is upward of 78% even without enrichment (and 85-88% with it) despite the cyclical character of the process and the steam purges. The simplicity of the system is such that a minimum of supervision is required, an important consideration in remote utility locations and in industrial application.

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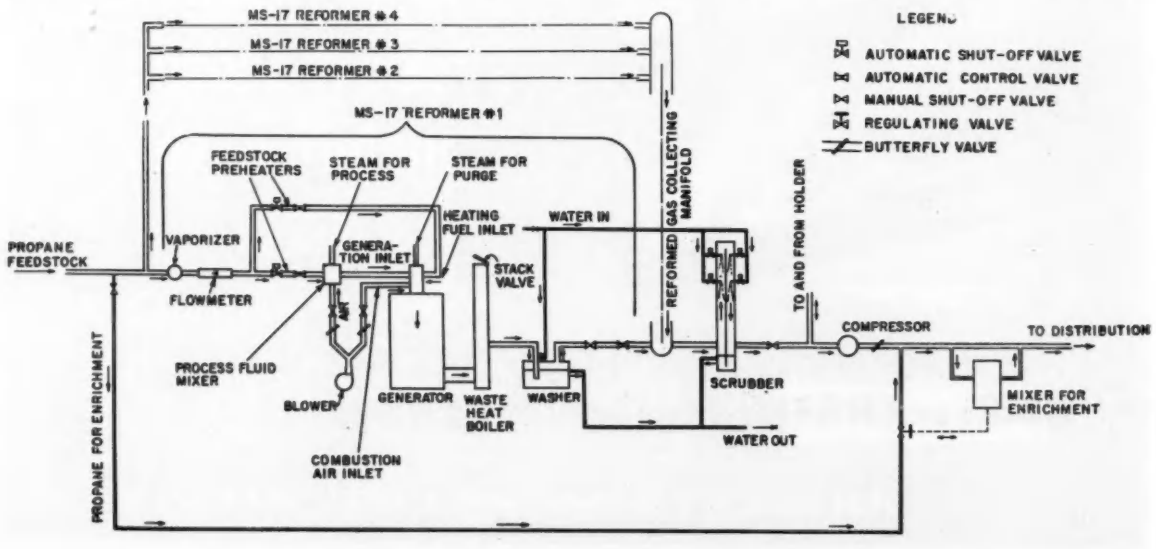
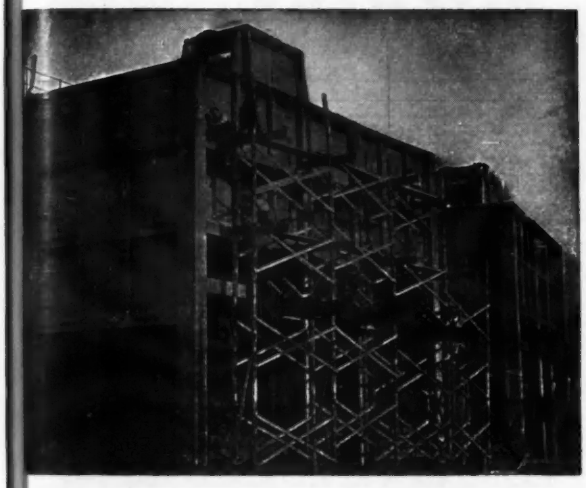


Gunite



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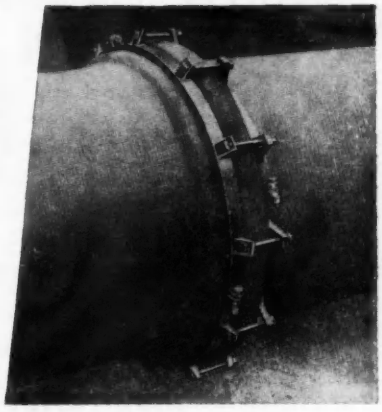

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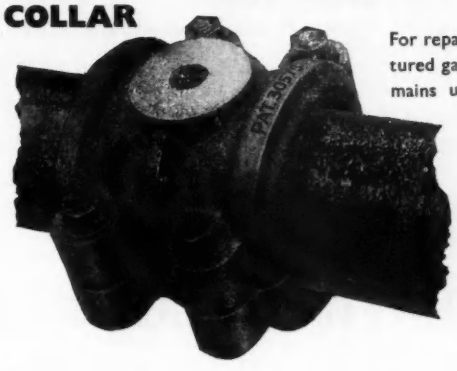

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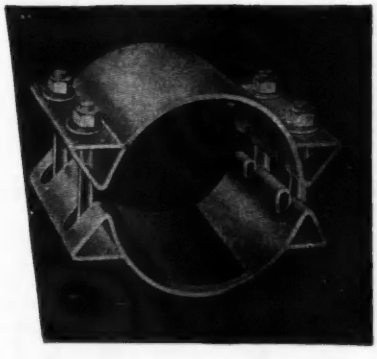

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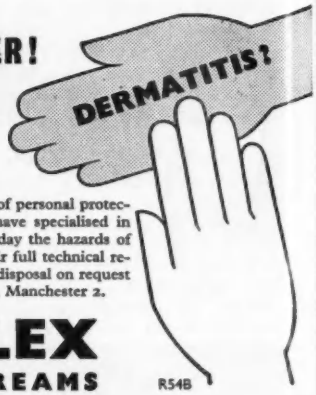

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Special forms of application may be obtained from the Personnel Manager, Southern Gas Board, 164, Above Bar, Southampton, and should be returned, completed, before May 1, 1957.

P. VALON BENNETT,
Personnel Manager.

(*Classified advertisements continued on page* 146)

APPOINTMENTS VACANT (ctd.)

THE NATIONAL COAL BOARD, South Western Division, invite applications for the post of MANAGER of the Cwm Coke Ovens and By-Product Plant, nr. Pontypridd.

Applicants should possess a wide experience of all aspects of carbonisation covering foundry coke production, including gas purification, gas producers, semi-direct ammonia recovery, etc. The Cwm Plant is now under construction and will be ready for operation towards the end of this year. It will have a carbonising capacity of about 1,500 tons of coal per day.

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HOME SERVICE ADVISER—WALSALL DISTRICT

CANDIDATES for the above position should have had at least two years' training in Domestic Science, with an appropriate Diploma, and be capable of working independently, and of conducting cookery and laundry demonstrations using gas appliances.

The salary will be within the ranges of Special Grade 4 (£316-£472 per annum, rising to eventual maximum of £515) or 5 (£443-£536 per annum, rising to eventual maximum of £580) of the National Salary Scales. The position will be superannuable and the successful candidate may be required to pass a medical examination.

Applications stating age, education, qualifications and experience, with names of two referees, should be sent to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, Staffs, to reach him not later than April 22, 1957.

J. C. INGRAM,
Secretary to the Board.

SCOTTISH GAS BOARD

FIFE GROUP
KIRKCALDY DISTRICT
DISTRIBUTION TECHNICAL ASSISTANT

APPLICATIONS are invited from suitably qualified technical assistants for the above position, on A.P.T. Grades 1/6 i.e., with a maximum on Grade 6 of £690 per annum. Qualified draughtsmen may be considered for the position, provided they are willing to learn technical distribution practice. Placing on the above grades will be according to experience and qualifications.

The person appointed will be required to prepare drawings, quantity sheets, estimates, and specifications in connection with all such work.

The successful applicant will be required to pass a medical examination, and to subscribe to the Board's Superannuation Scheme.

A modern house is available at a rent of £20 per annum.

Applications, endorsed "Distribution Technical Assistant," stating age, qualifications, and experience, and accompanied by a copy of each of three recent testimonials, should be lodged with the undersigned within fourteen days of this advertisement.

JOHN H. FULTON,
District Manager.

Scottish Gas Board,
Fife Group, Kirkcaldy District,
28, Links Street,
Kirkcaldy.

April 12, 1957.

SCOTTISH GAS BOARD

EDINBURGH AND SOUTH-EASTERN DIVISION
CONSTRUCTION AND MAINTENANCE ENGINEER

APPLICATIONS are invited for the above appointment on the staff of the General Manager at the Headquarters of the Edinburgh and South-Eastern Division of the Board.

Applicants should be Corporate Members of an appropriate professional Engineering Institution. The successful applicant will be responsible to the Deputy Divisional General Manager for the construction and maintenance of plant and buildings throughout the Division.

The commencing salary will be within Group 'C' of the National Salaries Table for Senior Officers, £1,225-£1,425 per annum with placing according to qualifications and experience

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age and giving particulars of education, training, experience and qualifications, together with the names of two referees should be addressed to the undersigned to reach him within 14 days of the appearance of this advertisement.

A. T. HERD,
Secretary.

26, Drumsheugh Gardens,
Edinburgh 3.

April 10, 1957.

WALES GAS BOARD

MERTHYR TYDFIL AND DOWLAIS UNDERTAKING
APPOINTMENT OF DISTRICT SUPERINTENDENT AMENDED

APPLICATIONS are invited from suitably qualified persons for the above appointment for which the salary will be within Grade 6/7 A.P.T. Provincial 'A' (£610 to £750). A flat will be made available at a reasonable rental.

Applicants should be experienced in modern Distribution practice, including Mainlaying, Planning, Consumer Sales Service and Showrooms.

The successful applicant will be required to pass a medical examination and to join the Wales Gas Board Pension Scheme.

Applications, stating age, experience, qualifications and particulars of training with names of two referees to the undersigned within 14 days of the appearance of this advertisement.

D. EMRYS WEST, M.Inst.Gas E., M.Inst.F.,
General Manager and Engineer.

Wales Gas Board,
Merthyr Tydfil & Dowlais Undertaking,
Gas Offices,
143, High Street,
Merthyr Tydfil.

NORTH WESTERN GAS BOARD

SOUTH LANCASHIRE GROUP
SHOWROOM MANAGER—ST. HELENS

APPLICATIONS are invited for the above pensionable appointment at a salary within Grade A.P.T. 7 (£670/£750 p.a.).

Applicants must have had considerable experience of showroom supervision, appliance sales, consumer service and window and general display practice. Possession of the certificate in Gas Salesmanship and Consumer Service or an equivalent qualification would be an advantage.

Detailed applications, giving the names of two referees, should reach the General Manager, South Lancashire Group, N.W.G.B., Radiant House, Cotham Street, St. Helens, within 14 days.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited for the following pensionable appointments, according to experience and qualifications:—

EAST LANCASHIRE GROUP
DISTRICT SERVICE MANAGER—BLACKBURN DISTRICT

The commencing salary will be not less than £1,225 p.a.

The person appointed will be responsible to the Group General Manager for all aspects of consumer service within the Blackburn District, which has 51,000 consumers and includes Darwen. The duties include the control of showrooms, sales and administrative staff, the appliance and meter repair workshops and the operation of gas installation and maintenance personnel.

Detailed applications, giving the names of two referees, should reach the General Manager, East Lancashire Group, N.W.G.B., Gas Offices, Cardwell Place, Blackburn, within 14 days.

NORTH CHESHIRE GROUP
SENIOR INDUSTRIAL GAS ENGINEER

The salary will be within Grades A.P.T. 10/12 (£820/£1,025 p.a.).

Applicants should have had considerable experience in the industrial use of gas. Qualifications in fuel technology or related subjects would be an advantage.

Detailed applications, giving the names of two referees, should reach the General Manager, North Cheshire Group, N.W.G.B., Great Portwood Street, Stockport, within 14 days.

BENZOLE PRODUCTS SALESMAN required for leading distributors. Good salary, bonus, luncheon vouchers, pension scheme, commission paid after satisfactory trial period. Apply: No. 321, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

COAL TAR PRODUCTS SALESMAN required. Good knowledge home and export markets, preferably under 35 years, but age no bar. Good salary and commission. Apply: No. 321, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

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UTILISATION OF GAS
SMITH & LE FEVRE
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WALTER KING, LTD.
11, Bolt Court, Fleet Street,
E.C.4.

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The Holmes-Western Valve is of the double disc parallel slide type and has been specifically designed for the Gas and Coking Industries.

British Patent No. 758253.

Holmes-Western Valve. Type 263 - 10" 'Horizontal' with extended gear bracket, without indicator.

Write for copy of Publication No. 52/5

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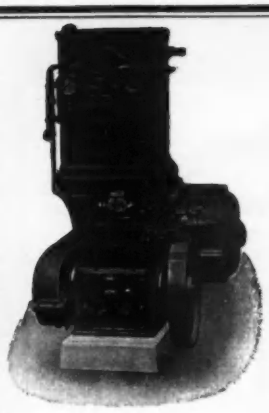
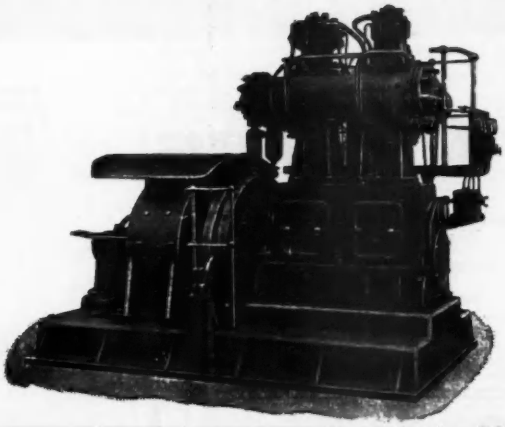


HIGH PRESSURE GAS COMPRESSORS *for*

pressures up to 5,000 lbs. per sq. in.

The illustrations show two high pressure gas compressors. As specialists in the design and manufacture of compressors for both air and gases, we make compressors for a wide range of capacity and pressure up to 5000 lbs. per sq. inch.

The compressor shown above has a capacity of 25 cu. ft. of free hydrogen per minute compressed to 3000 lbs./sq. inch. The illustration on the right shows a four-stage compressor with a delivered capacity of 200 cu. ft. of free town's gas per minute compressed to 5000 lbs. per sq. inch.

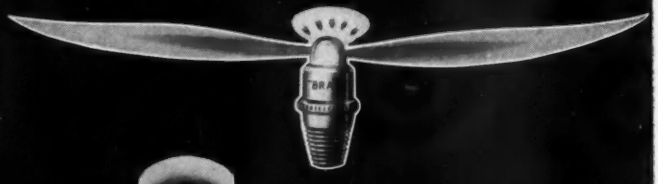


For full information regarding gas compressors, write, giving particulars of the duty required, to—

REAVELL & CO., LTD.
RANELAGH WORKS, IPSWICH
Telegrams: "REAVELL, IPSWICH." Phone Nos. 2124 & 2125

BRAY
NEAT GAS JETS

NON-ATMOSPHERIC AND
ATMOSPHERIC TYPES



for COAL GAS
ACETYLENE
BUTANE · PROPANE
NATURAL GAS
METHANE Etc.

GEO. BRAY AND CO., LTD. LEICESTER PLACE, **LEEDS 2**
Tel. Leeds 20981/9 Grams. "Bray Leeds 2"

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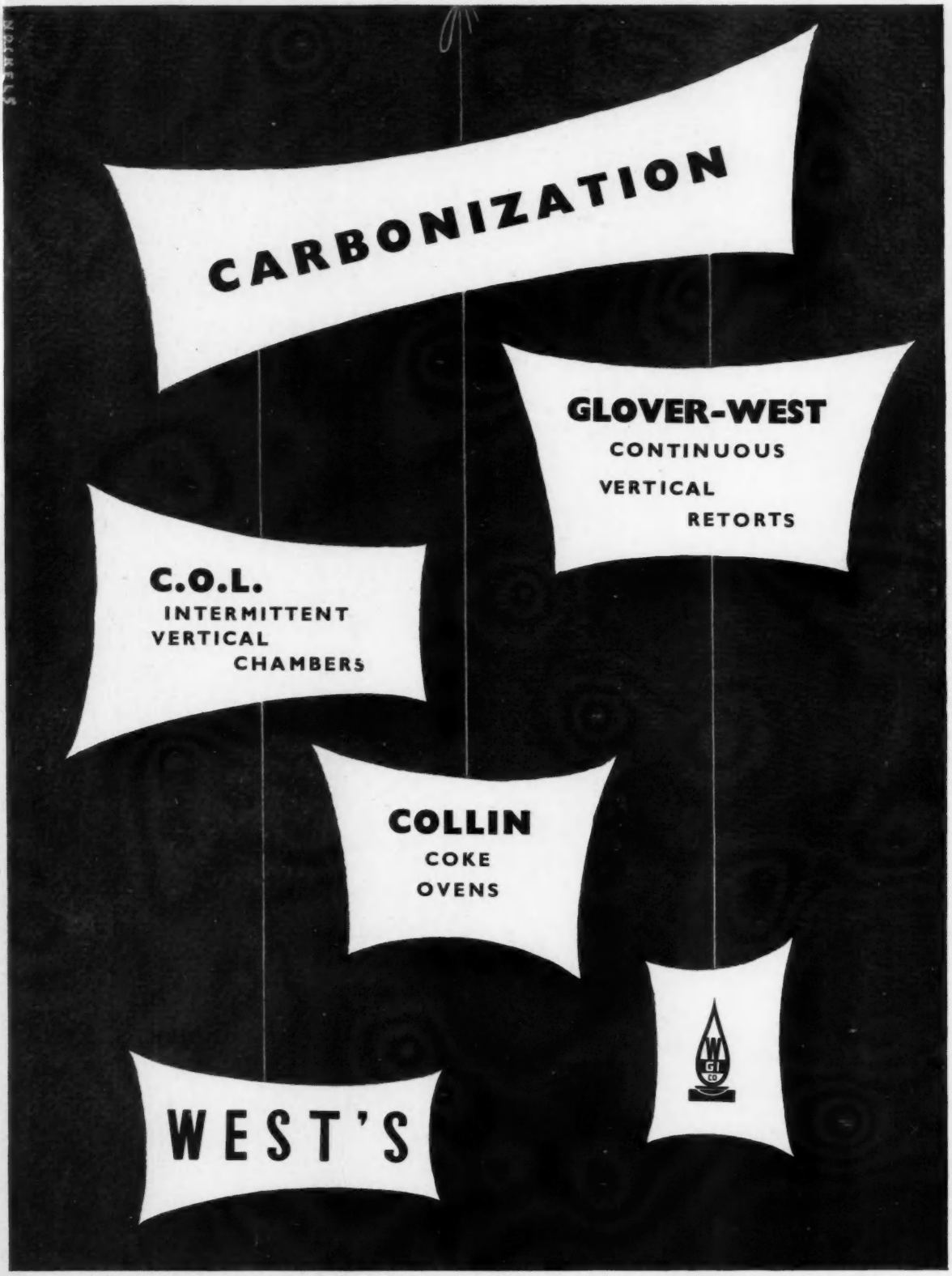

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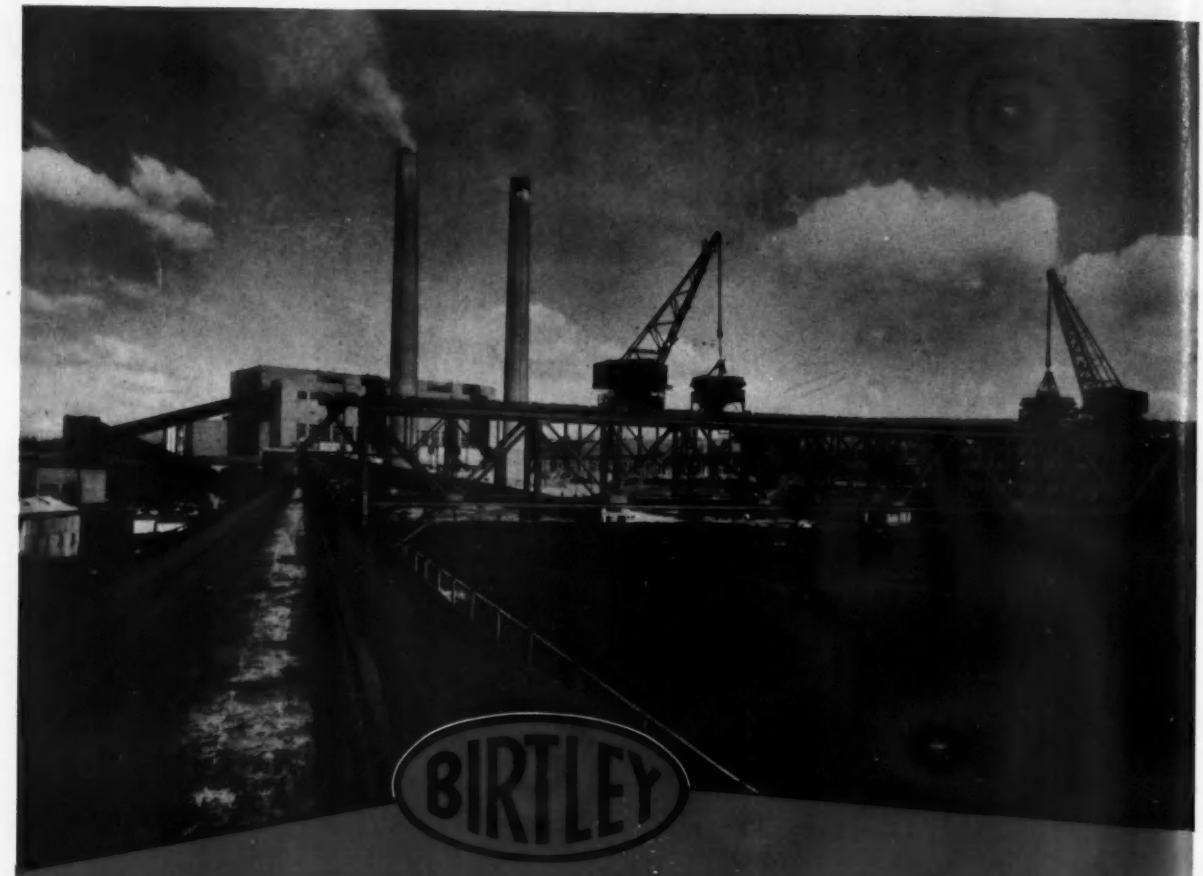
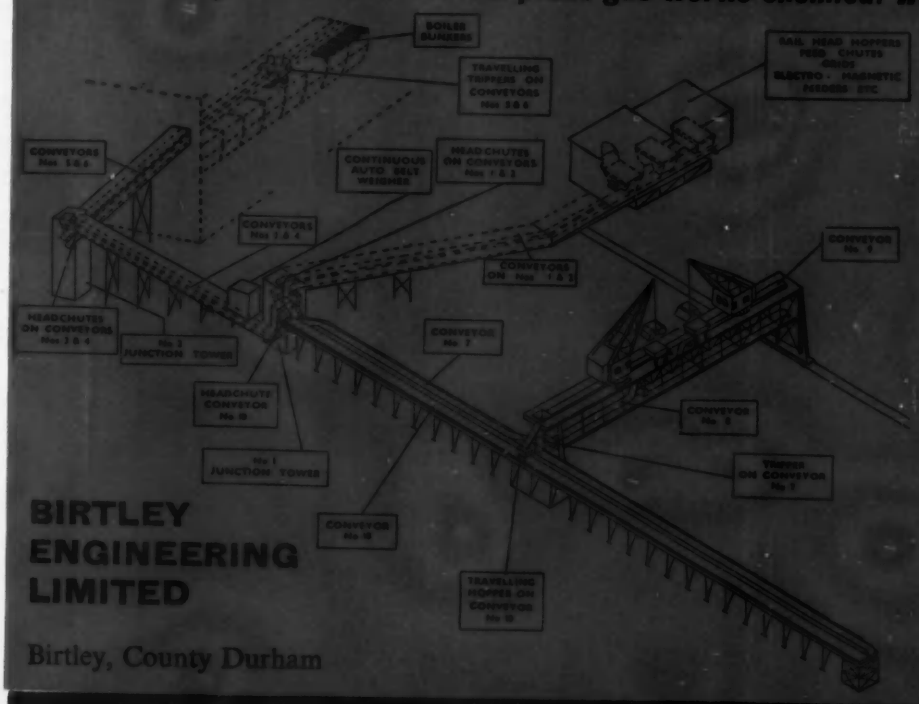
Telephone: COLlyhurst 2961 Telegrams: Stoker, Manchester
London: Columbia House, Aldwych, W.C.2. Tel.: HOL 4108 C.O.L. Div: Chandos House, Buckingham Gate, S.W.1. Tel.: ABB 6912
C.4



BIRTLEY

MATERIALS HANDLING PLANT

for power stations steel plant gas works chemical works etc.


BOILER BURNERS
TRAVELLING TRIPPER ON CONVEYORS Nos 3 & 4
GAS HEAD HOPPERS HEAD CHUTES ETC ELECTRO - MAGNETIC FEEDER ETC
CONVEYORS Nos 3 & 4
CONTINUOUS AUTO BELT WEIGHER
HEAD CHUTES ON CONVEYORS Nos 1 & 2
CONVEYORS Nos 1 & 2
CONVEYOR No. 1
CONVEYORS ON Nos 1 & 2
HEADCHUTES ON CONVEYORS Nos 3 & 4
No. 2 JUNCTION TOWER
CONVEYOR No. 2
HEADCHUTE CONVEYOR No. 10
CONVEYOR No. 9
No. 1 JUNCTION TOWER
TRIPPER ON CONVEYOR No. 9
CONVEYOR No. 10
TRAVELLING HOPPER ON CONVEYOR No. 10

General arrangement of 600 ton per hour coal handling plant at the Stella North Power Station of The Central Electricity Authority

(Consulting Engineers—Merz & McLellan)

Photo by courtesy C.E.A.

BIRTLEY ENGINEERING LIMITED

Birtley, County Durham